THE GENUS SOLIDAGO IN NORTHEASTERN NORTH AMERICA

By RAY C. FRIESNER

Attempts to identify the species of goldenrods found growing uncultivated in Indiana revealed species which could not be identified by use of any of the manuals commonly used for this section of North America. Then began a search through the literature to find new species and varieties described since the publication of the seventh edition of Gray's Manual and the second edition of Britton and Brown's Illustrated Flora. These were incorporated into the keys given in the manuals so that they would receive consideration at the proper points when specimens were being identified.

Continued study revealed the usual taxonomic pitfalls common to all short keys, resulting from the fact that the key, in order to be short, must fit the usual members of the species rather than give consideration to the many variations actually encountered in the field. This led to the construction of a key in which the same species was made to key out in as many places as were necessary to give consideration to the range of characteristics of the species in the field. An illustration of the point at issue is found in the case of *Solidago hispida,* which is usually considered to have an axillary type of inflorescence and is so keyed out in both of the manuals mentioned above. But actual field experience with this species shows that it can very readily be considered to have a terminal raceme and would, therefore, be sought for under the step in the key which considers the racemose type of inflorescence. The difficulty here as well as in other similar cases is due to the insensible gradation of upper cauline leaves into floral bracts. A similar illustration is found in the case of *Solidago gillmani,* which is keyed out in the manuals as of the racemose rather than the axillary type, and yet the average student of field plants would be just as apt to consider specimens to belong to the latter as to the former characterization. This sort of treatment of all species resulted in a rather long key but one which has proven far more useful in the field.

Summer vacations spent among the mountains and lakes of Maine led to the inclusion of that region, and the final result has been the nclusion of all species and varieties known to occur within the "Gray's

Manual range." This range was extended also to include all of north eastern North America which lies north of the "Gray's Manual range" as commonly understood.

The physical impossibility of carrying into the field all of the literature necessary to give complete descriptions of new species describe in various places and the desire to have all information in a compac form, capable of being taken on collecting trips and made available t the hundreds of students deriving much of their vacation pleasure fro botanizing, has led to the inclusion in this paper, along with the key of as complete a description of all species as was available either fro observation of the plants themselves or from the original author's ow description. In all cases the descriptions based upon the plants wer checked with the original description or the description in the manuals in order to make certain that the specimens yielding the data were properly identified to begin with. In April, 1929, my species were checke by Mr. K. K. Mackenzie, in order that my conceptions of species a that time might be verified. To him I here express my sincere thanks fo this service.

EXTENSIONS OF RANGE

This study has resulted in extension of the range of the followin species or varieties not previously recognized as occurring in Indiana

Solidago canadensis hargeri Fernald, previously recognized fro Massachusetts, Connecticut (10) and New York (15), is here extende into Ohio, Michigan and Indiana. Specimens from the latter group states are on deposit in the Butler University Herbarium.

Solidago uniligulata levipes Fernald, previously recognized fro western New York (10), is here extended into central and norther Indiana. Specimens from near Waverly, Morgan county (sixteen mile south of Indianapolis), and near South Gary, Lake county, are in th Butler University Herbarium.

NEW SPECIES

With much hesitancy I have finally yielded to what seems to be necessary on the basis of specimens collected and have named the followin two new species:

Solidago ovata sp. nov. has the general aspect of *S. ulmifolia* Muh and of *S. sphacelata* Raf. The leaves are ovate and the stem hair therein resembling the latter species; the leaves are coarsely and sharp dentate and less abruptly narrowed at the base, therein resembling the former species; the pappus is of short bristles measuring one to one and one-half times the length of the achene, while it is two to four times the length of the achene in the former species and one-half the length of the achene or less in the latter species. Since the material upon which this is based was originally collected from a wooded bank where both of the species which it resembles were growing, and since the pappus and leaf characters are intermediate between the two species, the new species here offered may prove to be a hybrid.

Solidago perglabra sp. nov. is closely allied to *S. graminifolia* (L.) Salisb. and *S. media* (Greene) Bush. Greene (13) recognized *S. hirtella* (Greene) Bush as a different species from the eastern and northeastern *S. nuttallii* (Greene) Bush. If Greene's *Euthamia hirtella* is maintained, it becomes necessary, upon the same type of character differences, to differentiate *S. perglabra* from *S. graminifolia*. *S. hirtella* and *S. perglabra* each differ from their respective northeastern relatives *(i. e., S. nuttallii* and *S. graminifolia)* in general aspect: The plants are larger, stem stouter and inflorescence broader, but the most definitely recognized difference is in the tegules (involucral bracts) and number of disc flowers. The tegules of *S. graminifolia* and *S. nuttallii* are all green-tipped and not sharply separated into two sorts; while in *S. hirtella* and *S. perglabra* only the outer tegules are green-tipped and the inner are abruptly longer and devoid of green tips. There is a difference also in number of flowers per head. Both of the northeastern species have a larger number of disc flowers than the more western forms.

S. perglabra also closely resembles *S. media*. It is possible that Greene's description (12) might be expanded to include what is here differentiated as *S. perglabra*. The differences are as follows: *S. perglabra* is 0.7-1.5 m. high, has five-veined leaves 7-15 cm. long and 6-10 mm. wide; *S. media* is 0.6-0.9 m. high, has three-veined leaves 5-8 cm. long and 3-5 mm. wide.

CHECK LIST OF INDIANA SPECIES

The following species (except Nos. 2, 9, 20, 25) have been observed, identifications verified, and are now on deposit in one or more of the following herbaria: Butler University, Charles C. Deam, DePauw University, Indiana University, Marcus W. Lyon, J. A. Nieuwland, University of Notre Dame, Purdue University and Wabash College. My sincere thanks are here expressed to the curators of these herbaria for their kindness in making these collections available for this study.

On the accompanying Maps, dots represent verified specimens for the counties containing the dot. "X" indicates that published reports include the additional counties containing "X" but that no specimen was observed from that particular county. Number preceding the species corresponds to map illustrating distribution of the particular species.

1. S. altissima
[1]2. S. arguta
3. S. bicolor
4. S. cæsia
5. S. cæsia axillaris
6. S. canadensis
7. S. canadensis hargeri
8. S. erecta
9. S. fisheri
10. S. gillmani
11. S. glaberrima
12. S. hispida
13. S. juncea
14. S. latifolia
15. S. longipetiolata
16. S. nemoralis
17. S. ohioensis
18. S. ovata
19. S. patula
20. S. racemosa
21. S. riddellii
22. S. rigida
23. S. rigidiuscula
24. S. rugosa
25. S. rupestris
26. S. serotina
27. S. serotina gigantea
28. S. shortii
29. S. speciosa
30. S. sphacelata
31. S. squarrosa
32. S. suaveolens
33. S. ulmifolia
34. S. uniligulata
35. S. uniligulata levipes
36. S. uniligulata neglecta
37. S. hirtella
38. S. media
39. S. perglabra
40. S. remota

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[1] This species has been listed in published reports for ten counties. These are shown on Map 2. These reports are probably all errors in identification. See "Excluded Species" below.

EXCLUDED SPECIES

The following species have been recorded in published reports but are excluded from the list of Indiana species of Solidago:

S. arguta has been reported for ten counties (see Map 2). These are probably all errors in identification. The specimens in Indiana herbaria so labelled have been referred by me to other species in every case. This is a northeastern and southeastern species which does not come into Indiana.

S. glomerata has been reported from Jefferson county. The only Indiana specimen observed with this label proved to be *S. erecta. S. glomerata* is a southern species which does not come into the Gray's Manual range.

S. graminifolia: All Indiana material falling under the Gray's Manual description of this species has been considered to be *S. perglabra* sp. nov. and the former species is not considered to come into Indiana.

S. graminifolia nuttallii: All of the Indiana material coming within the Gray's Manual description of this species has been considered to be *S. hirtella* and the former species is not considered to come into Indiana.

S. petiolaris has been reported for Clark and Jefferson counties. This is a southern and southwestern species which probably does not come into Indiana. No herbarium specimen bearing such a label has been seen from Indiana nor have I been able to find it now growing in these counties.

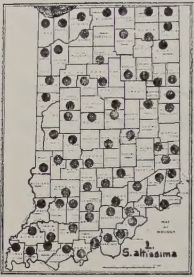
S. petiolata (S. stricta) has been reported from the bogs of Wayne county and several counties of the Lakes Region. It is very probable that most of these identifications should be referred to *S. uniligulata.* This is all the more probable since the former species is a southern coastal plains species and since the latter *(S. uniligulata)* is not mentioned in any of the above accounts. Occasional specimens in herbaria bearing this label have proved to be *S. ohioensis.*

S. puberula has been reported for Jefferson county. This species is limited to the eastern coastal regions, or, when inland, to the mountains. The identification in this case was very likely an error.

S. radula has been reported for Jefferson and Marshall counties. This is a western and southwestern species which I have not found to come into Indiana. Published reports of this species in Indiana should probably be referred to *S. nemoralis.*

S. tenuifolia has been reported by a large number of authors for various counties in northern and northwestern Indiana. All of these reports are due to failure to differentiate Greene's *Euthamia media* and *E. remota* from *S. tenuifolia.* As here defined, *S. tenuifolia* is a seaboard species and does not come into Indiana. All Indiana records of *S. tenuifolia* should be referred to *S. media* if the heads are glomerate, or to *S. remota* in case they are not glomerate.

S. uliginosa has been reported for most of the boggy regions of the Lakes area. All of these reports should be referred to *S. uniligulata. S. uliginosa* as here understood does not come into Indiana.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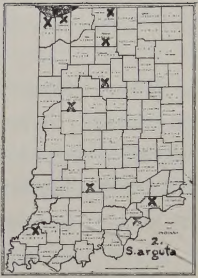
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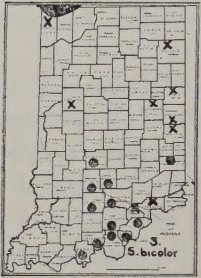
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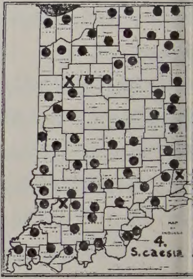
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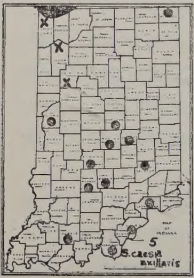
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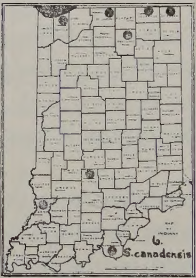
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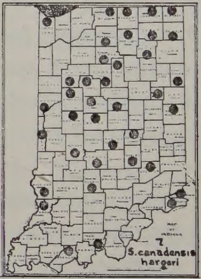
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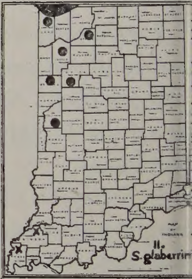
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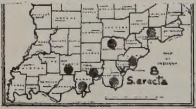
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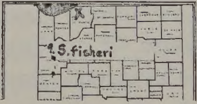
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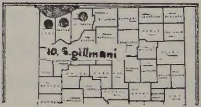
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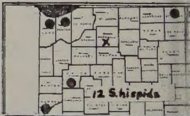
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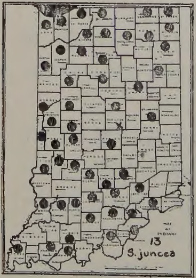
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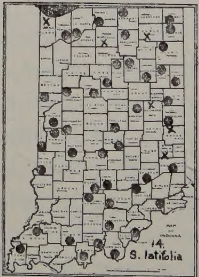
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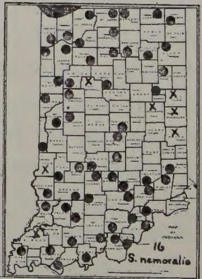
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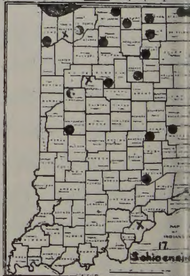
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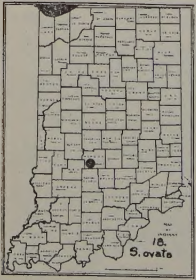
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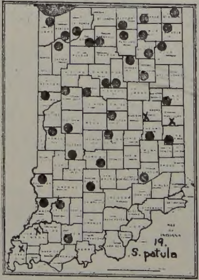
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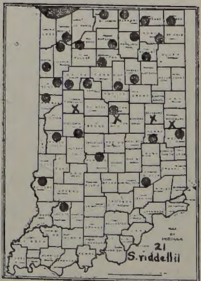
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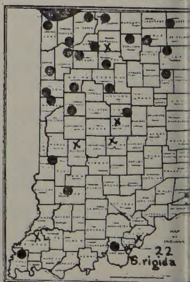
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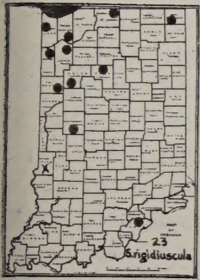
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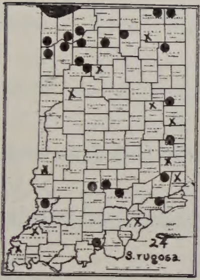
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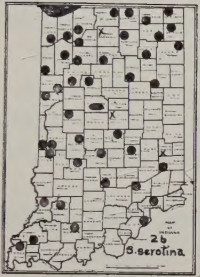
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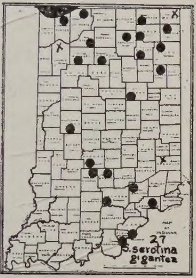
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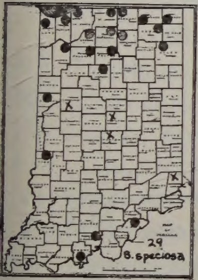
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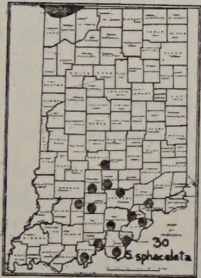
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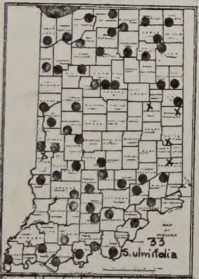
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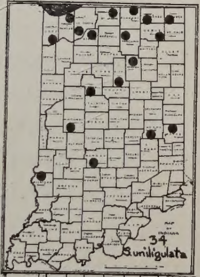
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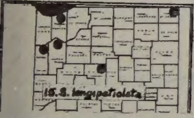
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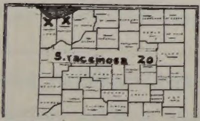
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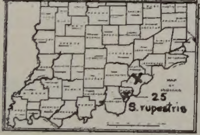
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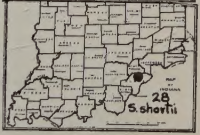
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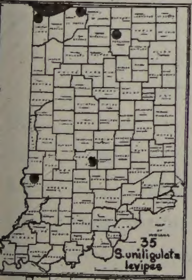
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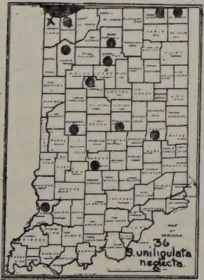
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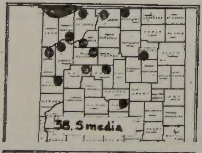
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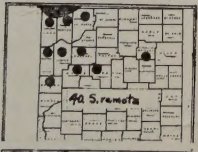
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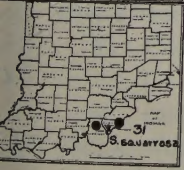
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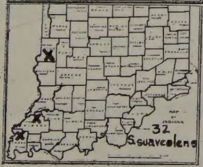
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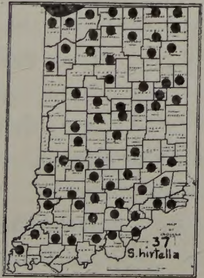
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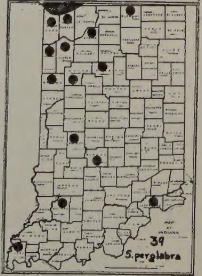
39 S. perglabra

KEY TO THE GOLDENRODS IN NORTHEASTERN NORTH AMERICA

1. Heads all distinctly pedicelled.. 2
1. Heads sessile or subsessile 125
    2. Tegules[1] squarrose 3
    2. Tegules erect, not squarrose.. 5
3. Rays 12-16, lower cauline leaves 1-2.5 dm. long.. *S. squarrosa* (82)
3. Rays 10 or less, lower cauline leaves 0.25-0.9 dm. long.. 4
    4. Leaves glutinous ....*S. wardii* (92)
    4. Leaves not glutinous..*S. petiolaris* (59)
5. Inflorescence chiefly axillary, *i. e.*, racemes in axils of ordinary leaves 6
5. Inflorescence chiefly racemose or paniculate.. 25
5. Inflorescence corymbose, not at all racemose.. 121
    6. Involucre 2-6 mm. high 7
    6. Involucre 6.1-8 mm. high, lower stem leaves gradually narrowed to base..*S. calcicola* (11)
    6. Involucre 8.1-12 mm. high, lower stem leaves abruptly narrowed to base..*S. macrophylla* (49)
7. Stems glaucous 8
7. Stems glabrous (not glaucous), puberulent or very sparingly pubescent 9
7. Stems distinctly pubescent.. 21
    8. Racemes compound ....*S. cæsia* (9)
    8. Racemes simple ....*S. cæsia axillaris* (10)
9. Achenes glabrous 10
9. Achenes pubescent 17
    10. Lowest stem leaves sharply serrate, acuminate.. 11
    10. Lowest stem leaves dentate or crenate, not acuminate.. 12
11. Heads about 4 mm. high..*S. monticola* (52)
11. Heads about 5.5-6.5 mm. high ....*S. castrensis* (14)
    12. Stems puberulent 13
    12. Stems glabrous 14
13. Cauline leaves 5-9 below inflorescence, coriaceous.. *S. hispida arnoglossa* (32)
13. Cauline leaves 7-20 below inflorescence, not coriaceous.. *S. hispida tonsa* (35)

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[1] Tegules are involucral bracts. Steele (26).

14. Leaf margins ciliolate 15

14. Leaf margins not ciliolate 16

15. Rays lemon to white .... *S. erecta* (24)

15. Rays orange or darker yellow .... *S. hispida tonsa* (35)

16. Involucre 3-5 mm. high; lower stem leaves 10-25 mm. wide .... *S. hispida tonsa* (35)

16. Involucre 5-6 mm. high; lower stem leaves 25-35 mm. wide .... *S. castrensis* (14)

17. Lower stem leaves of ovate type, abruptly narrowed to base .... *S. latifolia* (42)

17. Lower stem leaves of lanceolate type, gradually narrowed to base 18

18. Stem definitely angled .... *S. curtisii* (17)

18. Stem terete 19

19. Leaves acuminate .... *S. cæsia* (9)

19. Leaves acute but not acuminate 20

20. Rays 1-5 .... *S. ulmifolia* (87)

20. Rays 6-10 .... *S. gillmani* (28)

21. Rays white or cream colored .... *S. bicolor* (7)

21. Rays yellow 22

22. Pappus capillary, longer than achene 23

22. Pappus of minute scales, shorter than achene .... *S. sphacelata* (81)

23. Rays 8 or more, achenes only slightly pubescent 24

23. Rays 4-7, achenes densely pubescent .... *S. curtisii pubens* (18)

24. Stems pilose, *i. e.*, with long hairs not densely matted .... *S. hispida* (31)

24. Stems tomentose, *i. e.*, with densely matted hairs .... *S. hispida disjuncta* (33)

24. Stems arachnoid-lanate, *i. e.*, with long, fine spider-webby hairs .... *S. hispida lanata* (34)

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25. Heads secund, *i. e.*, racemes one-sided 26

25. Heads not secund 90

26. Plants of seacoast or brackish shores, leaves fleshy .... *S. sempervirens* (75)

26. Plants not maritime, leaves not fleshy 27

27. Leaves triple-nerved, *i. e.*, one pair of lateral veins decidedly more prominent than the others 28

27. Leaves not triple-nerved 50

28. Involucre 2-2.8 mm. high 29

28. Involucre 3-8 mm. high 30

29. Stems glabrous throughout .... *S. rupestris* (73)

29. Stems glabrous below, pubescent in inflorescence, leaves pubescent on nerves beneath .... *S. canadensis* (12)

29. Stems densely pubescent throughout, leaves densely cinereous, puberulent beneath .... *S. canadensis hargeri* (13)

30. Stem glabrous or very sparingly pubescent below inflorescence 31

30. Stem distinctly pubescent throughout 40

31. Achenes glabrous 32

31. Achenes pubescent 33

32. Lower stem leaves linear-lanceolate .... *S. glaberrima* (29)

32. Lower stem leaves oblanceolate .... *S. gattingeri* (27)

32. Lower stem leaves ovate-lanceolate .... *S. uniligulata neglecta* (90)

33. Stem entirely glabrous, even in inflorescence 34

33. Stem minutely pubescent in inflorescence 35

34. Largest cauline leaves not over 7 mm. wide .... *S. moritura* (53)

34. Largest cauline leaves 10 mm. wide or wider .... *S. juncea* (38)

35. Cauline leaves lance-attenuate .... *S. bartramiana* (6)

35. Cauline leaves oblong-lanceolate 36

36. Rays 5-7, achenes silky-pubescent .... *S. shortii* (78)

36. Rays 7-15, achenes finely pubescent 37

37. Leaves somewhat pubescent on both surfaces .... *S. juncea* (38)

37. Leaves glabrous on both surfaces, except for ciliolate margins 38

37. Leaves glabrous above, pubescent on veins beneath and ciliolate on margins .... *S. serotina gigantea* (77)

37. Leaves glabrous above, pubescent between veins beneath and ciliolate on margins .... *S. somesii* (79)

38. Leaves entire .... *S. sempervirens* (75)

38. Leaves not entire 39

39. Root leaves present at flowering time; axis and branches of inflorescence glabrous or sparingly pubescent; stem striate with prominent but shallow ridges decurrent from edges or midvein of leaf .... *S. juncea* (38)

39. Root leaves absent at flowering time; axis and branches of inflorescence densely pubescent; stem without decurrent ridges .... *S. serotina* (76)

40. Stem leaves of the lanceolate type 41

40. Stem leaves of oblong or oblanceolate type 45

40. Stem leaves of ovate or oval type 49

41. Stem and lower surface of leaves cinereous-tomentulose, viscid .... *S. lepida molina* (46)

41. Stem and lower surface of leaves with long, loose, soft hairs, not viscid .... *S. procera* (61)

41. Stem and lower surface of leaves with short, close pubescence, not viscid 42

42. Inflorescence almost overtopped by the upper leaves .... *S. lepida* (43)

42. Inflorescence subtended by much shorter leaves 43

43. Involucral bracts attenuate 44

43. Involucral bracts acute but not attenuate .... *S. altissima* (2)

44. Leaves coarsely, sharply serrate .... *S. lepida fallax* (45)

44. Leaves subentire or sparingly serrate above middle .... *S. lepida elongata* (44)

45. Stem scabrous, green, rays 3-7 .... *S. radula* (64)

45. Stem minutely grayish-pubescent; rays 5-9, leaves oblanceolate 46

45. Stem canescent; rays 5-9, leaves oblong 48

46. Lower stem leaves 3-6.25 times as long as wide; involucre 3-4.5 mm. high 47

46. Lower stem leaves 7-10 times as long as wide; involucre 4.5-5.5 mm. high .... *S. longipetiolata* (48)

47. Rays and disc yellow .... *S. nemoralis* (55)

47. Rays and disc yellowish-cream colored .... *S. nemoralis* forma *pallens* (55)

48. Lower stem leaves (blade plus petiole) 3-8 cm. long .... *S. mollis* (51)

48. Lower stem leaves (blade plus petiole) 15-18 cm. long .... *S. longipetiolata* (48)

49. Stem leaves broadly ovate or oval, glabrous or nearly so .... *S. drummondii* (21)

49. Stem leaves narrowly ovate to oblanceolate, canescent .... *S. mollis* (51)

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50. All leaves entire 51

50. At least lower stem leaves toothed 53

51. Rays 2-4, disc flowers 3-5 .... *S. suaveolens* (83)
51. Rays 5-6, disc flowers 9-15 .... *S. harrisii* (30)
51. Rays 7-10, disc flowers 10-15 52
52. Largest stem leaves not over 7 mm. wide .... *S. moritura* (53)
52. Largest stem leaves 10 mm. wide or wider .... *S. sempervirens* (75)
53. Leaves of the linear type 54
53. Leaves of lanceolate or broader type 55
54. Stems pubescent or puberulent, rays 3-5 .... *S. tortifolia* (84)
54. Stems entirely glabrous throughout, rays 8-9 .... *S. moritura* (53)
55. Stems densely pubescent or scabrous 56
55. Stems glabrous, puberulent or very sparingly pubescent 63
56. Stem leaves strongly rugose at least on lower surface 57
56. Stem leaves not rugose on either surface 59
57. Stem villous-hirsute, leaves narrowed at base 58
57. Stem scabrous, leaves rounded at base .... *S. rugosa aspera* (70)
58. Panicle much exceeding the subtending leaves .... *S. rugosa* (69)
58. Panicle equaled or exceeded by the subtending leaves .... *S. rugosa villosa* (72)
59. Lower stem leaves oblong-lanceolate to elliptical 60
59. Lower stem leaves oblanceolate .... *S. nemoralis* (55)
59. Lower stem leaves broadly ovate 62
60. Lower stem leaves distinctly sessile .... *S. fistulosa* (26)
60. Lower stem leaves distinctly short-petioled 61
61. Rays 6-9, stolons present (beneath soil surface) .... *S. rugosa* (69)
61. Rays 1-6, stolons absent .... *S. ulmifolia* (87)
62. Pappus of capillary bristles, twice as long as the achene .... *S. ulmifolia* (87)
62. Pappus of capillary bristles, just as long as the achene .... *S. ovata* (57)
62. Pappus of minute scales or bristles, one-half as long as the achene .... *S. sphacelata* (81)
63. Leaves very rough (to touch) on upper surface 64
63. Leaves not rough on upper surface 65

64. Stem strongly angled, at least below the middle .... *S. patula* (58)

64. Stem not angled .... *S. asperula* (5)

65. Stem purple, striate-angled .... *S. æstivalis* (1)

65. Stem green, not striate, or, if striate, not angled 66

66. Inflorescence a few slender and widely divergent primary leafy branches 67

66. Inflorescence with 1 primary and numerous secondary branches forming a more compact panicle or thyrse 74

67. Pappus of capillary bristles, as long or longer than the achene 68

67. Pappus of small scales or bristles, shorter than the achene .... *S. sphacelata* (81)

68. Lower stem leaves oblong, lanceolate or elliptic 69

68. Lower stem leaves ovate .... *S. ovata* (57)

69. Involucre cyclindric, 2 mm. thick 70

69. Involucre campanulate, 3 mm. thick .... *S. boottii* (8)

70. Rays 1-6 .... *S. ulmifolia* (87)

70. Rays 6-12 71

71. Leaves thick and only slightly veiny .... *S. asperula* (5)

71. Leaves thin and loosely veiny 72

72. Involucre 4.5-5.5 mm. high .. *S. elliottii divaricata* (23)

72. Involucre 3-4 mm. high 73

73. Leaves glabrous .... *S. rugosa sphagnophila* (71)

73. Leaves pubescent .... *S. rugosa* (69)

74. Leaves sessile throughout 75

74. Leaves petioled, at least below 77

75. Upper leaf surfaces entirely glabrous; rays 8-12; swamp species .... *S. elliottii* (22)

75. Upper leaf surfaces slightly pubescent; rays 1-4; dry soil species 76

76. Leaves ovate, abruptly narrowed, coarsely toothed .... *S. ovata* (57)

76. Leaves lanceolate to elliptic, gradually narrowed, moderately toothed .... *S. ulmifolia* (87)

77. Lower stem leaves abruptly narrowed to base 78

77. Lower stem leaves gradually narrowed to base 81

78. Pappus of capillary bristles, as long or longer than the achene 79

78. Pappus of minute scales or bristles, shorter than the achene .... *S. sphacelata* (81)

79. Achenes pubescent 80

79. Achenes glabrous .... *S. arguta* (4)

80. Leaves abruptly acuminate, curved at apex, lower surface glabrous except for hispidulous-scabrous margin .... *S. harrisii* (30)

80. Leaves gradually acute or acuminate, not curved at apex, lower surface pubescent throughout .... *S. ovata* (57)

81. Panicle as broad as high; rays 8-12 82

81. Panicle higher than broad; rays 1-8 84

82. Leaves strongly scabrous .... *S. juncea scabrella* (40)

82. Leaves not strongly scabrous 83

83. Heads only slightly secund .... *S. juncea ramosa* (39)

83. Heads definitely and strongly secund .... *S. juncea* (38)

84. Stems 1.25-9 dm. high; lower stem leaves narrowly lanceolate, 0.7-3 cm. wide 85

84. Stems 6-15 dm. high; lower stem leaves ovate to lanceolate, 3-8 cm. wide 86

85. Branches of panicle pubescent or hirtellous .... *S. uniligulata* (88)

85. Branches of panicle glabrous or glabrate and glutinous .... *S. uniligulata levipes* (89)

86. Lower stem leaves 0.75-1.25 dm. long 87

86. Lower stem leaves 1.5-3 dm. long .... *S. uniligulata neglecta* (90)

87. Rays 1-4; stolons absent .... *S. ulmifolia* (87)

87. Rays 6-9; stolons present 88

88. Leaves thick, only slightly veiny .... *S. asperula* (5)

88. Leaves thin, loosely veiny 89

89. Leaves pubescent on both surfaces .... *S. rugosa* (69)

89. Leaves glabrous on both surfaces .... *S. rugosa sphagnophila* (71)

90. Stem below the inflorescence scabrous; leaves all entire .... *S. lindeheimeriana* (47)

90. Stem below the inflorescence densely pubescent 91

90. Stem below the inflorescence glabrous, puberulent or very sparingly pubescent 92

91. Rays white .... *S. bicolor* (7)
91. Rays yellow 22
92. Plants not over 3 dm. high 93
92. Plants more than 3 dm. high 99
93. Heads with less than 30 flowers 94
93. Heads with 30-50 flowers 97
94. Leaves coriaceous .... *S. hispida arnoglossa* (32)
94. Leaves not coriaceous 95
95. Achenes glabrous .... *S. hispida tonsa* (35)
95. Achenes pubescent 96
96. Rays 7 .... *S. victorinii* (91)
96. Rays 8-15 .... *S. multiradiata* (54)
96. Rays 15-20 .... *S. chlorolepis* (16)
97. Cauline leaves 2-7 below the inflorescence .... *S. cutleri* (19)
97. Cauline leaves 8-15 below the inflorescence 98
98. Heads about 30-flowered .... *S. anticostensis* (3)
98. Heads about 50-flowered .... *S. mensalis* (50)
99. Stem puberulent throughout 100
99. Stem entirely glabrous or sparingly pubescent above, not puberulent 101
100. Cauline leaves 5-9 below the inflorescence, coriaceous .... *S. hispida arnoglossa* (32)
100. Cauline leaves 10 or more below the inflorescence, not coriaceous .... *S. puberula* (62)
101. Glabrous throughout 102
101. At least the axis or branches of inflorescence pubescent 103
102. Rays 8-10; stem mottled .... *S. klughii* (41)
102. Rays 5-7; stem essentially uniform in color .... *S. petiolata* (60)
103. Stem mottled .... *S. klughii* (41)
103. Stem not mottled 104
104. Bog species with wand-like inflorescence 105
104. Dryer soil species, inflorescence various 106
105. Apex of cauline leaves subulate-attenuate; tegules attenuate .... *S. uliginosa peracuta* (86)
105. Apex of cauline leaves acute or acuminate; tegules obtuse .... *S. uliginosa* (85)
106. Largest stem leaves 0.5-0.8 cm. wide at widest point 107
106. Largest stem leaves 1-5 cm. wide at widest point 109

107. Margin of lower stem leaves entire, ciliolate 108

107. Margins of lower stem leaves serrate, not ciliolate .... *S. racemosa* (63)

    108. Stems entirely glabrous below inflorescence .... *S. jejunifolia* (37)

    108. Stems with some short, appressed pubescence in the upper one-third below inflorescence .... *S. rigidiuscula* (68)

109. Margins of stem leaves scabrous-ciliolate, or with pubescence extending beyond margin so as to appear ciliolate 110

109. Margins of stem leaves not scabrous-ciliolate 116

    110. Cauline leaves entirely devoid of serrations 111

    110. Cauline leaves with occasional shallow teeth 113

    110. Cauline leaves decidedly serrate 114

111. Stem glabrous except for scant puberulence high in inflorescence .... *S. sciaphila* (74)

111. Stem glabrous below inflorescence, with short, coarse pubescence in inflorescence .... *S. jejunifolia* (37)

111. Stem glabrous below, sparingly appressed pubescent in upper one-third below inflorescence and rough pubescent in inflorescence 112

    112. Largest stem leaves 1-3 cm. wide .... *S. rigidiuscula* (68)

    112. Largest stem leaves 3.5-10 cm. wide .... *S. speciosa* (80)

113. Lower stem leaves ovate to broadly oval; rays orange-yellow .... *S. speciosa* (80)

113. Lower stem leaves lanceolate, oblong-lanceolate, or oblanceolate, or the very lowest sometimes obovate; rays very light yellow .... *S. erecta* (24)

    114. Stem below the inflorescence strongly pubescent or villous .... *S. hispida* (31)

    114. Stem below the inflorescence glabrous or with occasional hairs 115

115. Involucre 3-4.5 mm. high .... *S. juncea ramosa* (39)

115. Involucre 5.5-8 mm. high .... *S. gillmani* (28)

    116. Lower cauline leaves entire except for low teeth near the summit 117

    116. Lower cauline leaves with serrations not limited to the summits 118

117. Involucre 3-4 mm. high; plants 5-7.5 dm. high .... *S. chandonnetii* (15)

117. Involucre 4-5 mm. high; plants 8-9 dm. high.... *S. fisheri* (25)
118. Rays about 5.......... *S. sciaphila* (74)
118. Rays 6-10 119
119. Involucre 3.5-5 mm. high.......... *S. castrensis* (14)
119. Involucre 5.5-8 mm. high.......... 120
120. Heads very short-peduncled .... *S. randii* (65)
120. Heads distinctly slender-peduncled.... *S. gillmani* (28)

121. Leaves ovate, oval or broadly oblong, rough on upper surface .... *S. rigida* (67)
121. Leaves linear, lanceolate or oblanceolate 122
122. Leaves flat 123
122. Leaves V-shaped in cross section.......... 124
123. Rays fewer than disc flowers.......... *S. ohioensis* (56)
123. Rays more numerous than disc flowers.......... 125
124. Leaves partly sheathing the stem, 2-3 dm. long; plant stout and very leafy.......... *S. riddellii* (66)
124. Leaves not at all sheathing the stem, 1-1.25 dm. long; plant slender with scattered leaves.. *S. houghtonii* (36)

125. Largest leaves 5-veined, *i. e.*, with 3 prominent and 2 less distinct veins 127
125. Largest leaves 3-veined, *i. e.*, with 1 prominent and 2 less distinct veins 133
125. Larger leaves 1-veined, with no trace of lateral veins.......... 126
126. Stem simple to near the summit, then subcorymbosely branched .... *S. tenuifolia* (106)
126. Stem fastigiately branched from near the middle.......... *S. minor* (101)
127. Involucre 3-3.5 mm. high .... *S. polycephala* (104)
127. Involucre 4-5 mm. high.......... 128
128. Stems, branches, pedicels and leaves minutely and usually densely hirtellous.......... 129
128. Stems, branches and pedicels entirely glabrous, leaves glabrous except for scabrous margins.......... 130
129. Disc flowers average 3-7; outer tegules green and somewhat fleshy at summit, innermost tegules abruptly longer and without swollen green summits .... *S. hirtella* (98)

129. Disc flowers average 8-12; all tegules with swollen green summits, innermost not abruptly longer than outer .... *S. nuttallii* (102)

130. Outer tegules green and somewhat fleshy at summit, innermost tegules abruptly longer and without swollen green summits; disc flowers average 3-6 .... *S. perglabra* (103)

130. All tegules with swollen green summits and innermost tegules not abruptly longer than outer; disc flowers average 8-12 131

131. Stem simple to near the summit, then forming a very narrow subcorymbose inflorescence .... *S. galetorum* (94)

131. Stem branched above the middle forming an ample inflorescence 132

132. Leaves long-attenuate with sharp tips .... *S. graminifolia* (95)

132. Leaves not attenuate; tips bluntish .... *S. graminifolia septentrionalis* (96)

133. Involucre 5-6 mm. high 134

133. Involucre 3-4.5 mm. high 135

134. Ray plus disc flowers 10-14 .... *S. leptocephala* (99)

134. Ray plus disc flowers 16-20 .. *S. gymnospermoides* (97)

135. Plants simple to near the summit and then subcorymbose; leaves spreading or reflexed 136

135. Plants fastigiately branched from near the middle; leaves ascending 138

136. Leaves linear-attenuate with sharp tips, outer tegules without glandular-ciliate margins 137

136. Leaves obtuse or merely acute; outer tegules with glandular-ciliate margins .... *S. tenuifolia pycnocephala* (107)

137. Heads solitary or in 3's, all pedicellate, plants 6-12 dm. high .... *S. caroliniana* (93)

137. Heads all glomerate, very indistinctly pedicellate, plants 3-5 dm. high .... *S. tenuifolia* (106)

138. Heads glomerate, *i. e.*, sessile in clusters of 3-7; outer branches floriferous .... *S. media* (100)

138. Heads not glomerate, *i. e.*, nearly all with separate pedicel for each head; outer branches sterile or only sparsely floriferous .... *S. remota* (105)

DESCRIPTION OF SPECIES

Species descriptions are given with characters arranged in the same order for each species. Species are listed in alphabetical order except that those of the Euthamia group are listed together at the end.

1. SOLIDAGO ÆSTIVALIS Bicknell.

S. æstivalis Bicknell. Bul. Torr. Bot. Cl. 42:561. 1915.

STEM strongly striate-angled, glabrous or with occasional scattered hairs, typically deep or even bright purple, 2-20 dm. high; LEAVES elliptic-lanceolate, accuminate or attenuate, often abruptly rounded at extreme base, lowermost narrowed into long margined petioles, margins openly cut-serrate, upper surface glabrous, lower surface pubescent on veins, the larger 6-14 cm. long, 2-3 cm. wide; INFLORESCENCE thinly villous-pubescent, of wide-spreading and recurved foliaceous branches or elongated and short branched; HEADS secund; INVOLUCRE 2.5-3.5 mm. high; TEGULES linear-oblong to linear, obtuse, mostly ciliolate, subcarinate; RAYS 6-12; ACHENES pubescent.—Coastwise swamps of southern Long Island.

2. SOLIDAGO ALTISSIMA L. Map 1.

S. altissima L. Sp. Pl. 878. 1753.
S. scabra Muhl. Cat. 1813.
S. canadensis scabra T. and G. Fl. N. A. 2:224. 1841.
S. polyphylla Rydb. Bul. Torr. Bot. Cl. 31:651. 1904.
S. hirsutissima Mill. Gard. Dict. 8 ed. No. 15. 1768.
S. canadensis scabriuscula Porter, Mem. Torr. Bot. Cl. 5:318. 1894.

STEM short-pubescent or hirsute throughout or in older specimens the lower half of the stem below inflorescence may be devoid of hairs, 0.7-2 m. high; BASAL LEAVES lanceolate to elliptical, serrate, absent at flowering time; LOWER CAULINE LEAVES lanceolate to elliptical, acute at each end, sharply serrate to subentire, rough above, pubescent beneath, 7-15 cm. long, 0.8-2.4 cm. wide; UPPER CAULINE LEAVES gradually reduced and tending to be more nearly entire; INFLORESCENCE pubescent, paniculate, narrow or wide with recurving branches; HEADS strongly secund; INVOLUCRE 3-4.5 mm. high; TEGULES linear, acute or obtuse, 3-4 rows; RAYS 9-15; ACHENES pubescent.—Fields and waste places: Me. to Alb., Ida. and Ut. s. to Ga. and Tex.

Mackenzie (20) has shown that S. *altissima* L. was applied by Linnæus to what has been passing in the manuals as S. *rugosa* Mill. and that S. *hirsutissima* Mill. is the valid name of the S. *altissima* of the manuals.

3. SOLIDAGO ANTICOSTENSIS Fernald.

S. anticostensis Fernald, Rhodora 29:141-144. 1926.

STEM more or less glutinous, tufted or solitary, decumbent or erect, glabrous or sparsely minutely setulose, 0.8-2.5 dm. high; BASAL LEAVES elliptic-ovate or spatulate-obovate; CAULINE LEAVES 8-15 below inflorescence, narrowly obovate or oblanceolate, obtuse or subacute, crenate or entire, glabrous or minutely ciliolate, 1.5-5.5 cm. long, 4-15 mm. wide; INFLORESCENCE densely thyrsoidal, 2-6 cm. long, 2-2.5 cm. broad; HEADS nonsecund; INVOLUCRE 5.5-8 mm. high; TEGULES subcoriaceous, glutinous, lanceolate to oblong, obtuse; RAYS 10; DISC FLOWERS about 20; ACHENES strigose.—Seacoast rocks: Quebec.

4. SOLIDAGO ARGUTA Ait. Map 2.

S. arguta Ait. Hort. Kew. 3:213. 1789.
S. muhlenbergii T. and G. Fl. N. A. 2:214. 1841.
S. vaseyi Heller, Muhlenbergia 1:7. 1900.
S. verrucosa Schrad. Hort. Gatting. 12. t. 6.

STEM erect, stout, smooth or sparingly pubescent above, green, 0.6-2 m. high; BASAL LEAVES broadly ovate, serrate-dentate, present at flowering time; LOWER CAULINE LEAVES similar to basal, long petioled, acute or short acuminate, glabrous, 1-4 dm. long, 2-12 cm. wide; UPPER CAULINE LEAVES ovate to oblong, serrate to entire, sessile; INFLORESCENCE sparingly pubescent, an elongate, widely divergent, often leafy-bracted panicle; HEADS secund; INVOLUCRE 4 mm. high; TEGULES oblong, acute or obtusish, 3 or 4 rows; RAYS 5-7; ACHENE glabrous.—Open woods and thickets: Me. to Ont. s. to O., Tenn., Ala. and N. C. Also reported for Indiana.

5. SOLIDAGO ASPERULA Desf.

S. asperula Desf. Cat. Hort. Paris 3 ed. 403. 1829.

STEM erect, stout, smooth below, rough pubescent above, 7-14 dm. high; BASAL LEAVES absent at flowering time; LOWER CAULINE

LEAVES lanceolate to elliptic, thick and only slightly veiny, scabrous or glabrous, 1-2 dm. long; UPPER CAULINE LEAVES similar to lower except gradually reduced in size; INFLORESCENCE narrow to broad open panicle; HEADS secund; INVOLUCRE 4-5 mm. high; TEGULES lance-linear, acute to obtusish; RAYS 6-10; ACHENES pubescent.—Salt marshes: New England coast.

6. SOLIDAGO BARTRAMIANA Fernald.

S. bartramiana Fernald, Rhodora 17:1-20. 1915.

STEM cæspitose, slender, glabrous throughout, or sparingly pilose above, 2-3.5 dm. high; LEAVES uniform, lance-attenuate, entire or obsoletely serrate, glabrous throughout, or scabrous on margins beneath, 3-6 cm. long, 4-8 mm. wide; INFLORESCENCE an erect panicle, thyrsiform or corymbiform, 3-12 cm. long; HEADS nonsecund; INVOLUCRE 2.5-3 mm. high; TEGULES linear-attenuate, 1-2 rows; RAYS about 10; ACHENES 1.5-2 mm. long, hispid.—Newfoundland.

7. SOLIDAGO BICOLOR L. Map 3.

S. bicolor L. Mant. 1:114. 1767.
S. alba Mill. Gard. Dict. 8 ed. No. 26. 1768.
S. erecta DC. Prodr. 5:340. 1836.
S. viminea Bosc. in DC. Prodr. 5:341. 1836.

STEM erect, hairy throughout, simple or branched, 0.2-1.4 m. high; BASAL LEAVES obovate or ovate to oblong, coarsely serrate or sometimes entire, present at flowering time; LOWER CAULINE LEAVES ovate and long-petioled but rapidly becoming smaller, elliptic, shorter-petioled and less serrate, mostly acute at apex, pubescent on both surfaces, 5-10 cm. long, 2.5-5 cm. wide; UPPER CAULINE LEAVES much smaller, elliptic, sessile, entire or nearly so, pubescent on both surfaces; INFLORESCENCE more often narrow with both short axillary and terminal racemes but the axillary branches sometimes elongated into a wide open inflorescence; HEADS nonsecund; INVOLUCRE 3-5 (usually 4) mm. high; TEGULES oblong with dark green midrib and usually with swollen green tip, obtuse, 4-5 rows; RAYS 5-14, white or cream colored; ACHENES glabrous.—Dry soil: P. E. I. w. to Ont. and Minn., s. to Ga., Ala. and Ark.

8. SOLIDAGO BOOTTII Hook.

S. boottii Hook. Comp. Bot. Mag. 1:97. 1835.
S. brachyphylla Chapm. in T. and G. Fl. N. A. 2:218. 1841.

STEM erect, smooth below, pubescent or puberulent in inflorescence, slender, branched above, 0.5-1.5 m. high; BASAL LEAVES ovate to oblong-lanceolate, serrate, absent at flowering time; LOWER CAULINE LEAVES ovate, elliptical to oblong-lanceolate, acuminate, narrowed into short-margined petioles or sessile, serrate, glabrous below, slightly hispidulous on larger veins above, prominently reticulately veined, 7.5-15 cm. long, 2-3 cm. wide; UPPER CAULINE LEAVES much smaller, lanceolate, sessile, entire; INFLORESCENCE pubescent, lax and wide-spreading, leafy-bracted; HEADS secund at the tips of the long recurved branches; INVOLUCRE 3-4 mm. high; TEGULES oblong, acute or obtuse, 3-4 rows; RAYS 0-5; ACHENES pubescent.—Dry soil: Va., W. Va., w. to Mo., s. to Fla., Tex. and Okla.

9. SOLIDAGO CÆSIA L. Map 4.

S. cæsia L. Sp. Pl. 879. 1753.
S. argentea Hornem. Suppl. Hort. Hafn. 99.
S. arguta Spreng. Syst. 3:540.
S. flabellata Schrad. and Spreng. Syst. 3:540.
S. gracilis Poir. Lam. Encycl. 8:476. 1809.
S. gracilis Schrad. in DC. Prodr. 5:336. 1836.
S. lateriflora Raf. in DC. Prodr. 5:335. 1836.
S. schraderi DC. Prodr. 5:336. 1836.

STEM erect, slender, glabrous or glaucous, often bluish to purplish, 0.3-1 m. high; BASAL LEAVES absent; LOWER CAULINE LEAVES lanceolate to oblong-lanceolate or narrowly elliptical, acuminate, cuneate at base, sessile, sharply serrate, glabrous on both surfaces except for ciliate margins, 5-12 cm. long, 0.6-3 cm. wide; UPPER CAULINE LEAVES similar except gradually reduced; INFLORESCENCE glabrous except on ultimate branches and pedicels, axillary racemes; HEADS nonsecund; INVOLUCRE 3-5 mm. high; TEGULES oblong, obtuse, green-tipped, 3-4 rows; RAYS 2-5; ACHENES pubescent.—Deciduous woods: N. S., w. to Ont. and Minn., s. to Fla., w. to Tex. and Okla.

10. SOLIDAGO CÆSIA AXILLARIS (Pursh) Gray. Map 5.

S. axillaris Pursh, Fl. Amer. Sept. 542. 1814.
S. cæsia axillaris Gray, Proc. Amer. Acad. Sci. 17:189. 1882.

Similar to the species except in the inflorescence which is narrow and simple with very short axillary clusters of heads.—Distribution probably throughout the range of the species.

11. SOLIDAGO CALCICOLA Fernald.

S. calcicola Fernald, Rhodora 10:87. 1908.
S. virgaurea calcicola Fernald, Rhodora 1:190. 1899.

STEM clustered, erect, glabrous below, pubescent or somewhat glutinous above, purplish, 0.2-1 m. high; BASAL LEAVES elliptic, sharply serrate; LOWER CAULINE LEAVES oblanceolate, acuminate, narrowed to wing-margined petiole, entire in lower half, irregularly serrate n upper half, 1-1.5 dm. long; UPPER CAULINE LEAVES similar except long-acuminate, sessile; INFLORESCENCE pubescent, ample, dense thyrsoid-paniculate; HEADS nonsecund; INVOLUCRE 5-7 mm. high; TEGULES outer short, ovate-lanceolate, inner oblong-linear, obtuse or acute; RAYS short; ACHENES pubescent.—Calcareous cliffs and damp woods: n. Me. and Que.

12. SOLIDAGO CANADENSIS L. Map 6.

S. arcuata Tausch. Fl. 9:498. 1828.
S. canadensis L. Sp. Pl. 878. 1753.
S. canadensis glabrata Porter, Bul. Torr. Bot. Cl. 21:310. 1894.
S. eminens Gray, Fl. N. A. 2:157. 1884.
S. hirsuta L'Herit. in DC. Prodr. 5:330. 1836.
S. longifolia Schrad. in DC. Prodr. 5:330. 1836.
S. nutans Desf. Cat. Hort. Paris 3 ed. 402. 1829.
S. præcox Moench. Meth. 599.
S. reflexa Ait. Hort. Kew. 3:210. 1789.
S. tournefortii Tausch. Fl. 11:500. 1828.

STEM erect, slender, glabrous below, minutely pubescent above, .3-1.5 m. high; BASAL LEAVES absent; CAULINE LEAVES similar hroughout except gradually reduced upward, narrowly lanceolate, cuminate, cuneate at base, sessile, shallowly serrate or entire above, labrous above, pubescent on veins beneath, 2.5-12.5 cm. long, 0.6-1 m. wide; INFLORESCENCE dense pyramidal panicle, lower branches f panicle sometimes elongated, giving a somewhat flat-topped appear-

ance; HEADS secund; INVOLUCRE 2-2.8 mm. high; TEGULES linear, acute, 3-4 rows; RAYS 4-6; ACHENES sparingly short-pubescent.—Thickets, moist open places, banks of streams, margins of bogs: Nfd. to N. W. T., s. to Fla., La., Tex. and Ariz. Most of the Indiana records for this species must be transferred to S. *altissima* L. and the remaining still include both S. *canadensis* L. and S. *canadensis hargeri* Fernald.

13. SOLIDAGO CANADENSIS HARGERI Fernald. Map 7.

S. canadensis hargeri Fernald, Rhodora 17:1-20. 1915.

STEM erect, villous-hirsute, 1-2 m. high; BASAL LEAVES absent; CAULINE LEAVES narrowly lanceolate, acute to acuminate, cuneate, sessile or very short-petioled, entire or shallowly serrate, pubescent on both surfaces, similar throughout except upper gradually reduced, largest 7-15 cm. long, 1-2.5 cm. wide; INFLORESCENCE dense, broad panicle or sometimes more branched and open; HEADS secund; INVOLUCRE 2-2.8 mm. high; TEGULES linear, acute, 2-4 rows; RAYS 4-6; ACHENES pubescent.—Dry soil: Mass., Ct. (10) (4), N. Y. (15), O., Ind. and Mich. (Butler Univ. Herb.)

14. SOLIDAGO CASTRENSIS Steele.

S. castrensis Steele, U. S. Natl. Herb. Contr. 16:221-222. 1913.

STEM erect, glabrous to inflorescence, hispidulous in inflorescence, 0.6-0.75 m. high; BASAL LEAVES absent; CAULINE LEAVES narrowly elliptic-obovate, acute or apiculate, cuneate, petiolate below, sessile above, serrate in upper half and obscurely ciliolate in lower part of each leaf, glabrous (except for ciliolate margins), the largest 12-14 cm. long, 2.5-3.5 cm. wide; INFLORESCENCE loose below, compact and cylindraceous above; HEADS nonsecund; INVOLUCRE 3.5-5.5 mm. high; TEGULES linear to linear-oblong, obtuse, tipped with an oval herbaceous spot which extends downward in a narrower line; RAYS 6-8; ACHENES glabrous.—Juneau Co., Wis.

15. SOLIDAGO CHANDONNETII Steele.

S. chandonnetii Steele, U. S. Natl. Herb. Contr. 16:222. 1913.

STEM somewhat decumbent at base, moderately arcuate and irregularly somewhat flexuous, glabrous except high in inflorescence, then with short stout hairs, 0.5-0.75 m. high; BASAL LEAVES absent; LOWER CAULINE LEAVES oblong to obovate-lanceolate, obtuse to acute, petiolate, longest one-third of distance from base to inflorescence, entire and glabrous except for somewhat roughened upturned margins, the largest about 12 cm. long; UPPER CAULINE LEAVES gradually reduced, oblanceolate and sessile; INFLORESCENCE moderately dense, ovoid, paniculate; HEADS nonsecund; INVOLUCRE 3-4 mm. high; TEGULES oblong to linear, obtuse, minutely double-keeled; RAYS about 5-7; ACHENE ?—Dry sandy soil: Minn.

16. SOLIDAGO CHLOROLEPIS Fernald.

S. chlorolepis Fernald, Rhodora 17:3. 1915.

STEM erect or decumbent, tufted, glabrous or sparsely puberulent, 0.1-0.3 m. high; BASAL LEAVES "rosulate, spatulate-oblanceolate, rounded or subtruncate and crenate-serrate at apex, cuneate-petiolate at base, 2-6 cm. long, 0.6-1.3 cm. wide," glabrous on both surfaces; CAULINE LEAVES "remote, 3-8 below inflorescence, similar to basal"; INFLORESCENCE subsimple, loosely cylindric, 3.5-20 cm. long, 1.5-2 cm. in diameter; HEADS nonsecund, 1-4 per pedicel; INVOLUCRE 3-4 mm. high, viscid; TEGULES lanceolate to narrowly oblong, obtuse, 4-5 rows; RAYS 15-20; ACHENES hispid.—Serpentine barrens and ravines: Quebec.

17. SOLIDAGO CURTISII T. and G.

S. curtisii T. and G. Fl. N. A. 2:200. 1841.
S. pubescens Walp. Rep. 2:960.

STEM erect, slender, angled and grooved, glabrous or sparingly pubescent, 0.5-1 m. high; BASAL LEAVES absent; CAULINE LEAVES elongate-lanceolate or elliptical, long-acuminate, narrowed to entire base, sessile, sharply serrate in upper three-fourths of each leaf, glabrous or nearly so, 7.5-15 cm. long, 0.8-2.4 cm. wide; INFLORESCENCE axillary and terminal; HEADS nonsecund; INVOLUCRE 3-5 mm. high; TEGULES oblong, obtuse, 2-3 rows; RAYS 4-7; ACHENES pubescent.—Mountain woods: Va., W. Va., Ky. to Tenn. and Ga.

18. SOLIDAGO CURTISII PUBENS (M. A. Curtis) Gray.

S. curtisii pubens (M. A. Curtis) Gray. Man. 7 ed. 789. 1908.
S. pubens M. A. Curtis in Small Fl. S. E. U. S. 1192. 1923.

Differs from the species (see number 17) in being densely hairy on stems and lower leaf surfaces.—Va., W. Va. and Ky. to Ga.

19. SOLIDAGO CUTLERI Fernald.

S. cutleri Fernald, Rhodora 10:87-88. 1908.
S. alpestris Porter, Bul. Torr. Bot. Cl. 20:210-211. 1893.
S. virgaurea alpina Bigel. Fl. Bost. 2 ed. 307. 1824.

STEM, erect or ascending, tufted, angled, glabrous or slightly pubescent, 0.05-0.3 m. high; BASAL LEAVES obovate to oblanceolate, shallowly serrate or crenate in upper two-thirds, present at flowering time; CAULINE LEAVES 2-5, oblanceolate to oblong, acute, cuneate, sessile or lowest somewhat petioled, shallowly serrate in upper one-half, glabrous; INFLORESCENCE a short terminal raceme and often with axillary clusters; HEADS nonsecund; INVOLUCRE 6-8 mm. high; TEGULES lanceolate to oblong, obtuse or acute, sometimes glutinous, 5-6 rows; FLOWERS 30-50; ACHENES pubescent.—Highest alpine districts of Me., N. H., Vt. and N. Y.

20. SOLIDAGO DECUMBENS Greene.

S. decumbens Greene, Pittonia 3:161. 1897.

STEM decumbent, rigid, "clustered at summit of strong perpendicular root," "usually dark red, sparsely puberulent," 0.05-0.4 m. high; BASAL LEAVES similar to lower cauline; LOWER CAULINE LEAVES spatulate-obovate to oblanceolate, obtuse or acutish, more or less distinctly serrate toward the summit, scabrous on margins, 1.5-9 cm. long, 0.8-2 cm. wide; UPPER CAULINE LEAVES similar except few and reduced; INFLORESCENCE interruptedly thyrsoidal; HEADS nonsecund; TEGULES linear, obtusish, somewhat glandular-viscid, about 3 rows; ACHENES loosely strigose-hispidulous.—Dry slopes or summits of Rocky Mountains: Col., Wash., Alb., B. C., also shores of L. Superior and on Mt. Albert, Que.

21. SOLIDAGO DRUMMONDII T. and G.

S. drummondii T. and G. Fl. N. A. 2:217. 1841.
S. ulmifolia Hook. Comp. Bot. Mag. 1:97. 1835.

STEM erect, slender, soft-pubescent, 0.3-1 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES broadly ovate or oval, acute at apex, narrowed to short petiole, serrate, soft-pubescent, 7.5-10 cm. long, 3.5-5 cm. wide; UPPER CAULINE LEAVES similar except gradually smaller, finally entire and sessile; INFLORESCENCE terminal, paniculate; HEADS secund; INVOLUCRE 3-4 mm. high; TEGULES oblong-lanceolate, obtuse; RAYS 4-6; ACHENES pubescent.—Cliffs and rocky woods: Ill. and Mo. to La.

22. SOLIDAGO ELLIOTII T. and G.

S. elliottii T. and G. Fl. N. A. 2:218. 1841.
S. elliptica Ell. Sketches 2:376. 1824.
S. elongata Gray, Syn. Fl. N. A. 2:153. 1884.

STEM erect, stout, glabrous below, minutely puberulent above, 0.5-1.8 m. high; BASAL LEAVES absent; CAULINE LEAVES elliptical or oblong-lanceolate, acute or acuminate, gradually narrowed to a broad sessile base, slightly crenate-serrate, glabrous on both surfaces, shining above, thick, 2.5-7.5 cm. long, 8-24 mm. wide; INFLORESCENCE dense pyramidal-paniculate, slightly spreading; HEADS secund; INVOLUCRE 4-5.5 mm. high; TEGULES linear-oblong, obtuse, 3-4 rows; RAYS 6-12; ACHENES pubescent.—Swamps: N. S. to Ga. Mainly coastal.

23. SOLIDAGO ELLIOTTII DIVARICATA Fernald.

S. elliottii divaricata Fernald, Rhodora 17:7. 1915.

STEM erect, sparingly villous, 0.5-1.5 m. high; BASAL LEAVES absent; CAULINE LEAVES crowded, elliptic, 3-6 cm. long, 1.5-2 cm. wide, coarsely crenate-serrate, sparingly setose on nerves beneath; INFLORESCENCE leafy, divaricate, recurved at apex of branches, bracteolate; HEADS secund; INVOLUCRE 5-5.5 mm. high; TEGULES linear-oblong, obtuse, 3-4 rows; RAYS 8-12; ACHENES pubescent.—Meadow: Fresh pond, Block Island, R. I.

24. SOLIDAGO ERECTA Pursh. Map 8.

S. erecta Pursh, Fl. Amer. Sept. 2:542. 1814.
S. speciosa angustata T. and G. Fl. N. A. 2:205. 1841. (In part.)
S. speciosa erecta (Pursh) McMillan Minnesota Geol. Nat. Hist.
Sur. Bot. Ser. 1:513. 1892.

STEM erect, slender, glabrous or puberulent above, 0.6-1 m. high; BASAL LEAVES oblanceolate to obovate or oval, obtuse, crenate-dentate, present at flowering time; LOWER CAULINE LEAVES similar to basal, narrowed to margined petioles, ciliolate on margins, glabrous on both surfaces, 5-15 cm. long, 1-4 cm. wide; UPPER CAULINE LEAVES lanceolate to oblong-lanceolate, acute, entire, narrowed to sessile base; INFLORESCENCE narrow, terminal panicle and axillary in upper leaf axils; HEADS nonsecund; INVOLUCRE 4-5 mm. high; TEGULES oblong, obtuse, with green thickened tip and narrow median line, 4-5 rows; RAYS very light yellow or even white, about 6; ACHENES glabrous.—N. Y., N. J., w. Pa., s. O., sw. Ind., Ky., s. in mts. to Tenn., Ala. and Ga. Also reported from Michigan (23).

25. SOLIDAGO FISHERI Steele. Map 9.

S. fisheri Steele, Contr. U. S. Natl. Herb. 16:223. 1913.

STEM erect, "slender, glabrous nearly or quite to the inflorescence, there thinly or distally more thickly hispidulous," 0.6-0.9 m. high; LOWER CAULINE LEAVES oblong or narrowly obovate, obtuse or apiculate, petiolate, entire or with few low crenations near summit, glabrous except the margins, the largest 11-17 cm. long, 2-4 cm. wide; UPPER CAULINE LEAVES reduced in size, subpetiolate, entire; INFLORESCENCE paniculate, narrowly ovoid or cylindraceous; HEADS nonsecund; INVOLUCRE 4-5 mm. high; TEGULES oblong to linear-oblong, obtuse, thick and firm; RAYS 5-9; ACHENES glabrous.—Sand hills: Michigan City, Ind.; also Kilbourn, Wis.

26. SOLIDAGO FISTULOSA Mill.

S. fistulosa Mill. Gard. Dict. 8 ed. No. 19. 1768.
S. pilosa Walt. Fl. Car. 207. 1788.
S. pyramidata Pursh, Fl. Amer. Sept. 2:537. 1814.
S. villosa Ell. Sketches 2:372. 1821-24.

STEMS erect, stout, hirsute, 1-2.5 m. high; BASAL LEAVES absent; LOWER CAULINE LEAVES ovate-oblong to lanceolate, obtuse or acute, sessile, serrulate, hirsute on margins and lower surface, 2.5-10 cm. long, 1-2 cm. wide; UPPER CAULINE LEAVES similar except smaller, entire; INFLORESCENCE a dense pyramidal panicle; HEADS secund; INVOLUCRE 4 mm. high; TEGULES lanceolate, acute, 4-5 rows; RAYS 7-10, very short; ACHENES minutely pubescent.—Low country: N. J. and Va. to Fla. and La.

27. SOLIDAGO GATTINGERI Chapm.

S. gattingeri Chapm. Gray, Syn. Fl. 2:156. 1884.

STEM erect, slender, strict, glabrous throughout, 0.6-1 m. high; BASAL LEAVES oblanceolate to spatulate, acute, ciliolate, serrulate, present at flowering time; LOWER CAULINE LEAVES similar to basal, gradually narrowed to margined petioles, glabrous beneath, rough above, 7.5-15 cm. long, 1.2-2 cm. wide; UPPER CAULINE LEAVES reduced rapidly to minute entire bracts; linear-oblong to oblanceolate, sessile; INFLORESCENCE a spreading subcorymbose panicle: HEADS secund; INVOLUCRE 3-4 mm. high; TEGULES oblong, obtuse; RAYS 6-10; ACHENES appressed-puberulent or glabrate below.—Dry soil: Tenn. and Mo.

28. SOLIDAGO GILLMANI (Gray) Steele. Map 10.

S. gillmani Steele, Contr. U. S. Natl. Herb. 13:367. 1911.
S. humilis gillmani A. Gray, Proc. Amer. Acad. Sci. 17:191. 1882.
S. virgaurea gillmani Porter, Bul. Torr. Bot. Cl. 20:209. 1893.
S. racemosa gillmani Fernald, Rhodora 10:91. 1908.

STEM erect or ascending, stout, glabrous up to inflorescence, then puberulent, 0.5-1.1 m. high (or long); BASAL LEAVES oval to oblanceolate, serrate, tapering to long margined petioles, present at flowering time, those on sterile shoots being similar but larger; LOWER CAULINE LEAVES oblanceolate, acute, narrowed to winged petioles, serrate, glabrous except scabrous-ciliolate margins, 8-14 cm. long, 1.5-2.5 cm. wide, coarsely reticulate; UPPER CAULINE LEAVES lanceolate, sessile by cuneate base; INFLORESCENCE "heavy, paniculate by simple racemes distributed along the axis"; HEADS nonsecund; INVOLUCRE 6-8 mm. high; TEGULES oblong, obtuse, herbaceous-tipped, 4-5 rows; RAYS 6-10; ACHENES sparingly pubescent.—Sand dunes and flats: Bois Blanc Is. (Lake Huron (8)), St. Joseph and S. Haven, Mich. (26), Presque Isle Co., Mich. (Butler Univ.

Herb.), Laporte, Porter and Lake Cos., Ind. (26) (Deam Herb., Nieuwland Herb. and Butler Univ. Herb.), w. Ont. (Greene Herb. U. of Notre Dame.)

29. SOLIDAGO GLABERRIMA Martens. Map 11.

S. glaberrima Martens, Bul. Acad. Brux. 8:68. 1841.
S. missouriensis Nutt. Trans. Amer. Phil. Soc. II-27:37. 1840. (In part.)
S. missouriensis A. Gray, Syn. Fl. 1(2):155. 1884.
S. serotina Hook. Comp. Bot. Mag. 1:97. 1835.
S. inornata Lunell, Amer. Midland Nat. 2:142-149. 1911.
S. missouriensis Nutt. in Gray Man. 7 ed. 794. 1908. (In part.)

STEM erect, slender, glabrous to inflorescence 0.2-1 m. high; BASAL LEAVES oblanceolate to spatulate, petioled; LOWER CAULINE LEAVES lanceolate to linear, acuminate, narrowed to base, petioled or sessile, entire or sparingly serrate, very rough margined, 3-15 cm. long; UPPER CAULINE LEAVES similar except smaller, sessile, commonly with axillary fascicles; INFLORESCENCE a broad pyramidal panicle; HEADS secund; INVOLUCRE 3-5 mm. high; TEGULES oblong, green-tipped, outer obtuse, inner acute; RAYS 6-13; ACHENES nearly glabrous.—Dry prairies: Man. se. to Minn., Wis. and Mich.; sw. to nw. Ind., Ill., Mo., Okla. and Tex., w. to Ariz., and nw. to Ida. and Ore.

Since this species has been referred in Gray's Manual 7 ed. to *S. missouriensis* Nutt. and since that species as now understood is a far western form, all Indiana references to it should be transferred to *S. glaberrima* Martens.

30. SOLIDAGO HARRISII Steele.

S. harrisii Steele, U. S. Natl. Herb. Contr. 13:359-374. 1911.

STEM ascending, smooth, finely striate 0.3-0.8 (1.5?) m. high; BASAL LEAVES broadly elliptic-ovate, entire, present on sterile tufts at flowering time; LOWER STEM LEAVES broadly elliptic-ovate, abruptly short acuminate, abruptly contracted below into a broadly cuneate petiole, entire, hispidulous-scabrous on the margin, glabrous, thick and coriaceous, 10-20 cm. long, 3-6 cm. wide; UPPER CAULINE LEAVES similar except gradually smaller; INFLORESCENCE puberulent at least on branchlets and peduncles, one-sided, loose, pyramidal, branches stiffly arcuate; HEADS secundly racemose, single or in groups of 3-5; INVOLUCRE 4-5 mm. high; TEGULES coriaceous, oblong with deltoid, ovate or rounded tip; RAYS about 5; DISC FLOWERS 9-15; ACHENES strigose.—Clay at base of mountains and shale hills: W. Va., Md. and Va.

31. SOLIDAGO HISPIDA Muhl. Map 12.

S. bicolor concolor T. and G. Fl. N. A. 2:197. 1841.
S. hirsuta Nutt. Jour. Acad. Sci. Phila. 7:103. 1834.
S. hispida Muhl. in Willd. Sp. Pl. 3:2063. 1804.

STEM erect, pubescent, green, 0.4-0.9 m. high; BASAL LEAVES oval, dentate, long-petioled, present at flowering time; LOWER CAULINE LEAVES oval, oblanceolate or obovate, acute or obtuse, narrowed to margined petiole, dentate, pubescent on both surfaces, 5-13 cm. long, 2.5-5 cm. wide; UPPER CAULINE LEAVES oblong, sessile, dentate or entire; INFLORESCENCE pubescent, axillary racemose clusters and a terminal panicle; HEADS nonsecund; INVOLUCRE 4-6 mm. high; TEGULES oblong, whitish yellow, obtuse, uniform or somewhat swollen at tip; RAYS light yellow; ACHENES glabrous or very slightly pubescent.—Dry soil: Nfd. to Man., s. to Okla. and Ga.

32. SOLIDAGO HISPIDA ARNOGLOSSA Fernald.

S. hispida arnoglossa Fernald, Rhodora 17:2. 1915.

STEM stout, puberulent, 2-3 dm. high; BASAL LEAVES oblong-obovate, rounded at apex, crenate; CAULINE LEAVES 5-9 below inflorescence, oblong-obovate, obtuse, coriaceous, crenate, glabrous above, sparingly hirtellous below; upper 5-8 cm. long, 2-2.5 cm. wide; INFLORESCENCE dense thyrsiform panicle, lower racemes axillary; HEADS nonsecund; INVOLUCRE 4-5 mm. high.—Sea cliffs: Nfd.

33. SOLIDAGO HISPIDA DISJUNCTA Fernald.

S. hispida disjuncta Fernald, Rhodora 17:2. 1915.

STEM slender, white tomentose, 0.7-2.5 dm. high; BASAL LEAVES spatulate-oblanceolate, hispidulous on both surfaces, 1-2 cm. wide; CAULINE LEAVES 2-5 below inflorescence, spatulate-oblanceolate, hispidulous on both surfaces; INFLORESCENCE racemiform panicle, loosely cylindric; HEADS nonsecund; INVOLUCRE 5-6 mm. high.—Calcareous cliffs: Quebec.

34. SOLIDAGO HISPIDA LANATA (Hook.) Fernald.

S. bicolor lanata Gray, Proc. Amer. Acad. Sci. 17:190. 1882.
S. hispida lanata Fernald, Rhodora 10:87. 1908.
S. lanata Hook. Fl. Bor. Amer. 2:4. 1834.

Differs from other members of this species-complex in that the stem is arachnoid-lanate.—Plains of Sask. and river banks of Gaspe, Que., and northernmost Me.

35. SOLIDAGO HISPIDA TONSA Fernald.

S. hispida tonsa Fernald, Rhodora 17:2. 1915.

STEM glabrous or sparingly puberulent; BASAL LEAVES oblanceolate to narrowly obovate, 1-2.5 cm. wide; CAULINE LEAVES 7-20 below inflorescence, lower similar to basal, mostly subacute, sparingly or not at all ciliolate, glabrous, subglabrate or pilose on nerves beneath, upper 1-5 cm. long; 2-8 mm. wide; INFLORESCENCE a dense thyrsiform panicle; INVOLUCRE 3-5 mm. high.—Serpentine tableland and slopes: Nfd., N. B. and Que.

36. SOLIDAGO HOUGHTONII T. and G.

S. houghtonii T. and G. Man. 211. 1848.

STEM smooth, slender, 3-6 dm. high; CAULINE LEAVES scattered, linear-lanceolate, acutish, lower with margined petioles, upper sessile by narrow base, margins rough, glabrous on both surfaces, 5-13 cm. long, 5-10 mm. wide; INFLORESCENCE corymbose; HEADS nonsecund; INVOLUCRE 6-8 mm. high; TEGULES oblong, obtuse; RAYS 7-9; DISC FLOWERS 13-21; ACHENES glabrous.—Swamps: Joliet, Ill., Mich. and Genesee Co., N. Y.

37. SOLIDAGO JEJUNIFOLIA Steele.

S. jejunifolia Steele, Contr. U. S. Natl. Herb. 16:223-224. 1913.

STEM erect, glabrous to inflorescence, then clothed with sparingly short pubescence, light-colored, striate-angled, about .77 m. high; LOWER CAULINE LEAVES oblanceolate to lanceolate, acute, petiolate, longest at about fourth to sixth leaf from base, entire and glabrous except for hispidulous-ciliate margins, the largest 7-8 cm. long, about 9 mm. wide; UPPER CAULINE LEAVES linear-oblanceolate, ovately acute at tip, short attenuate at base, glabrous except hispidulous-ciliate on margins; INFLORESCENCE cylindrical, 20 cm. long, 5-6 cm. wide; racemes strongly ascending, simple or slightly compounded; HEADS nonsecund; INVOLUCRE 5 mm. high; TEGULES oblong, ovately tipped, scarcely herbaceous; RAYS 5-8; ACHENES glabrous. —Indian River, Cheboygan Co., Mich.

38. SOLIDAGO JUNCEA Ait. Map 13.

S. juncea Ait. Hort. Kew. 3:213. 1789.
S. ciliaris Muhl. Willd. Sp. Pl. 2056. 1803.
S. arguta T. and G. Fl. N. A. 2:214. 1841.
S. arguta var. juncea, Gray, Man. 5 ed. 243. 1867.

STEM erect, glabrous throughout (occasionally pubescent individuals are found), green or reddish 0.5-1.4 m. high; BASAL LEAVES lanceolate to ovate-lanceolate, tapering to long petioles, occurring at flowering time, but on sterile plants; LOWER CAULINE LEAVES oblong-lanceolate or elliptical to ovate-lanceolate, acute or acuminate, gradually narrowed to a long-winged petiole, margins scabrous, sharply serrate to nearly entire, minutely to coarsely pubescent on both surfaces, 1.5-4 dm. long, 1.5-5 cm. wide; UPPER CAULINE LEAVES similar except much smaller and sessile; INFLORESCENCE a wide pyramidal panicle; HEADS secund; INVOLUCRE 3-4 mm. high; TEGULES ovate-lanceolate to oblong, obtuse with a darker central line, about 4 rows; RAYS 7-12; ACHENES glabrous or sparingly pubescent.—Dry open fields: N. B. w. to Hudson's Bay, s. to Sask., Mo. and S. C.

39. SOLIDAGO JUNCEA RAMOSA Porter and Britton.

S. juncea ramosa Porter and Britton, Bul. Torr. Bot. Cl. 18:368. 1891.

Differs from the species in general aspect due to the fact that the branches are "numerous, strict and erect . . . . the racemes numerous, slender, erect or slightly recurved at the ends" and the heads only slightly secund.—Fields: N. J., Pa., O. and W. Va.

40. SOLIDAGO JUNCEA SCABRELLA Gray.

S. juncea scabrella, A. Gray, Syn. Fl. 2:155. 1884.

Differs from the species only in that the leaves are very strongly scabrous due to numerous very short, stout hairs on the upper surface. It is not possible to separate this sharply from the species and, in so far as Indiana material is concerned, the variety cannot be maintained.

41. SOLIDAGO KLUGHII Fernald.

S. klughii Fernald, Rhodora 17:5. 1915.

STEM erect, slender, very smooth, mottled, 0.6 m. high; LOWER CAULINE LEAVES narrowly linear, subulate-attenuate, rigid, narrowed into a long-margined petiole; MEDIAN CAULINE LEAVES 4-10 cm. long, 2-3 mm. wide; INFLORESCENCE a slender erect panicle, 1 dm. long, 1.5 cm. in diameter; HEADS nonsecund; INVOLUCRE 3-4 mm. high; TEGULES outer and median lanceolate, acute, thick, with green glutinous midrib, inner linear, obtuse, straw-colored, ciliate; RAYS 8-10; ACHENES ?.—Bruce Co., Ont.

42. SOLIDAGO LATIFOLIA L. Map 14.

S. latifolia L. Sp. Pl. 879. 1753.
S. flexicaulis L. Sp. Pl. 879. 1753.
S. macrophylla Bigel. Fl. Bost. 2 ed. 305. 1824.
S. flexicaulis latifolia Willd. Sp. Pl. 3:2064. 1803.

STEM erect or ascending, zigzag, angled, glabrous, green, 0.3-1 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES ovate, acuminate, abruptly narrowed to margined petiole, sharply serrate, glabrous or slightly pubescent on upper surface, pubescent on lower surface, 5-15 cm. long, 2.5-10 cm. wide; UPPER CAULINE LEAVES similar except smaller, uppermost varying to lanceolate and entire; INFLORESCENCE axillary and short terminal racemes; HEADS nonsecund; INVOLUCRE 4-6 mm. high; TEGULES oblong, ciliate at apex, obtuse to acutish; RAYS 3-4; ACHENES pubescent.—Woods: Nfd., N. S. and N. B. to N. Dak., s. to Kan. and se. to Ga.

43. SOLIDAGO LEPIDA DC.

S. lepida DC. Prodr. 5:339. 1836.

STEM erect, puberulent or minutely pilose, 1-1.5 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES elliptic-oblong to broadly lanceolate, acuminate, narrowed to short petiole, coarsely serrate, pubescent; UPPER CAULINE LEAVES similar except gradually reduced in size; INFLORESCENCE a short compact panicle; HEADS secund; INVOLUCRE 3-5 mm. high; TEGULES linear, 3 rows.—Nfd. s. to N. B. and Me., w. to Ore. and n. to Alaska.

44. SOLIDAGO LEPIDA ELONGATA (Nutt.) Fernald.

S. elongata Nutt. Trans. Amer. Phil. Soc. 7:327. (1840) 1841.
S. elata Hook. Fl. Bor. Amer. 2:5. 1834.
S. stricta Less. Linnæa 6:502. 1831.
S. serra Rydb. Bul. Torr. Bot. Cl. 31:650. 1904.
S. lepida elongata Fernald, Rhodora 17:9. 1915.

STEM erect, smooth or minutely pubescent, 0.3-0.8 m. high; BASAL LEAVES similar to cauline, absent at flowering time; LOWER CAULINE LEAVES lanceolate, acute or acuminate at both ends, subentire or serrate above the middle, glabrate or puberulent; UPPER CAULINE LEAVES similar to lower except smaller; INFLORESCENCE pubescent, virgate or narrowly pyramidal panicle, 1-2 dm. long, at length somewhat spreading; HEADS secund; INVOLUCRE 3-5 mm. high; TEGULES linear-subulate, acute, 3 rows; RAYS small and slender, 1-2 mm. long, 0.4-0.5 mm. wide; ACHENES pubescent.—Dry ground: Qué., n. Me., n. N. Y., w. across continent, from Col. to Alb.

45. SOLIDAGO LEPIDA FALLAX Fernald.

S. lepida fallax Fernald, Rhodora 17:9. 1915.

STEM erect, minutely pilose above, 0.5-1.5 m. high; CAULINE LEAVES lanceolate to oblanceolate, acuminate, coarsely sharp-serrate, glabrous or more or less scabrous above, scabrous on nerves beneath, 5-15 cm. long; INFLORESCENCE minutely pubescent, erect panicle with branches not at all or only slightly recurved, somewhat corymbiform or pyramidal, 1-3 dm. long, 0.7-2 dm. wide; HEADS secund; INVOLUCRE 3-5 mm. high; TEGULES linear-lanceolate, 3 rows; ACHENES pubescent.—Nfd. to B. C., s. to n. N. B., n. Me., n. Mich., Ut. and Wash.

46. SOLIDAGO LEPIDA MOLINA Fernald.

S. canadensis gilvocanescens Rydb. in Gray Man. 7 ed. 1908.
Not Rydb., Contr. U. S. Natl. Herb. 3:162. 1895.
S. lepida molina Fernald, Rhodora 17:9. 1915.

STEM erect, densely cinereous-tomentulose, somewhat viscid, .35-.45 m. high; CAULINE LEAVES oblong-lanceolate, crowded, coarsely serrate, scabrous above, densely cinereous-pilose and somewhat viscid below; INFLORESCENCE minutely pubescent, erect, terminal rhomboid panicle, 5-9 cm. long; HEADS secund; INVOLUCRE 3-4 mm. high; TEGULES linear, 3 rows; ACHENES pubescent.—Limestone detritus and gravelly slopes: Barre, Que.

47. SOLIDAGO LINDEHEIMERIANA Scheele.

S. lindeheimeriana Scheele, Linnæa 21:599. 1848.

STEM erect, rigid, scabrous or cinereous-puberulent, .25-1 m. high. LOWER CAULINE LEAVES oblong, elliptic, broadly lanceolate to oval, acute, narrowed or rounded at base, sessile or short-petioled, entire, scabrous-puberulent, 3-7 cm. long, somewhat glossy, 1-2 cm. wide; UPPER CAULINE LEAVES similar except all sessile and smaller; INFLORESCENCE a short, dense, narrow panicle; HEADS non-secund; INVOLUCRE campanulate, 5.5-7 mm. high; TEGULES acute or obtuse, puberulent; ACHENES nearly glabrous.—Limestone bluffs and rocky woods: Kan. to Tex., n. N. Mex.

48. SOLIDAGO LONGIPETIOLATA Mackenzie and Bush.
Map 15.

S. longipetiolata Mackenzie and Bush, Trans. St. Louis Acad. Sci., 12:79-89. 1902.

STEM erect, densely puberulent, 0.4-1 m. high; BASAL LEAVES oblanceolate, serrate, present at flowering time; LOWER CAULINE LEAVES linear-oblanceolate, 7-10 times as long as wide, acute at apex, narrowed to petiole at base, shallowly and remotely serrate to almost entire, pubescent on both surfaces; UPPER CAULINE LEAVES abruptly reduced, sessile, entire; INFLORESCENCE densely, finely pubescent, 2.5-15 cm. long, one-sided, either with short branches and a more elongate recurved top or with several longer recurved branches; HEADS secund; INVOLUCRE 4.5-5.5 mm. high; TEGULES oblong, acute to obtusish, thickened at apex, 4-5 rows; RAYS 3-12; DISC FLOWERS 8-12; ACHENES strongly pubescent.—Rocky woods, barrens, wooded dunes: Mich. to Wis., s. to Ind., Ill., Ia., Kan., Okla. and Tex.

49. SOLIDAGO MACROPHYLLA Pursh.

S. leiocarpa DC. Prodr. 5:339. 1836.
S. macrophylla Pursh, Fl. Amer. Sept. 2:542. 1814.
S. multiradiata Nutt. Tran. Amer. Phil. Soc. 7:328. 1841.
S. thyrsoidea E. Mey. Pl. Labrad. 63. 1830.
S. virgaurea Bigel. Fl. Boston 2 ed. 306. 1824.

STEM erect, stout, striate, glabrous or sparingly pubescent, 0.2-1.3 m. high; BASAL LEAVES ovate, sharply and coarsely serrate, present at flowering time; LOWER CAULINE LEAVES ovate, acute or acuminate, rapidly narrowed to rounded base, long-margined-petioled, coarsely and sharply serrate, glabrous or sparingly pubescent beneath, 7.5-12.5 cm. long, 2.5-7 cm. wide; UPPER CAULINE LEAVES lanceolate, sessile, entire; INFLORESCENCE pubescent, axillary and terminal loose racemes; HEADS nonsecund; INVOLUCRE 8-12 mm. high; TEGULES linear to linear-attenuate, acute, 4-5 rows; RAYS 8-10; ACHENES glabrous or nearly so.—Rocky, mountainous woods: Catskill Mts., N. Y. to Nfd., w. to L. Superior.

50. SOLIDAGO MENSALIS Fernald.

S. mensalis Fernald, Rhodora 17:4-5. 1915.

STEM erect, solitary, glabrous except for pilose summit, 2-3 dm. high; BASAL LEAVES narrowly elliptic, long-petioled, serrate-dentate; LOWER CAULINE LEAVES cuneate-oblanceolate, short-acuminate, subpetiolate, serrate-dentate above middle, blade 3-4.5 cm. long, 1-2 cm. wide; UPPER CAULINE LEAVES similar except smaller, sessile and entire or subentire; INFLORESCENCE pilose, racemiform, loose, subsimple; HEADS nonsecund; INVOLUCRE 7-10 mm. high; TEGULES with glutinous midribs, 3-4 rows, outer lance-attenuate, ciliolate; inner linear, acuminate, pale-margined; RAYS 15; DISC FLOWERS 35; ACHENES strigose.—Calcareous, north-facing cliffs: Gaspe Co., Que.

51. SOLIDAGO MOLLIS Bartl.

S. incana T. and G. Fl. N. A. 2:221. 1841.
S. mollis Bartl. Ind. Sem. Goett. 5. 1836.
S. nemoralis incana. Gray, Proc. Amer. Acad. Sci. 17:197. 1882.

STEM erect, stout, rigid, canescent, .15-0.5 m. high; LOWER CAULINE LEAVES rigid, oval or oblong, ovate or oblanceolate, obtuse, petioled, entire or dentate, 5-25 cm. long, 0.6-2.4 cm. wide; UPPER CAULINE LEAVES smaller, sessile; INFLORESCENCE pubescent, scarcely one-sided thyrsoid panicle; HEADS scarcely secund; INVOLUCRE 4-6.5 mm. high, greenish yellow; TEGULES ovate or oblong, obtuse or acute; RAYS 5-9; ACHENES sparingly pubescent.—Dry hills and plains: Man. to Tex., N. Mex., Col. and Mont.

52. SOLIDAGO MONTICOLA T. and G.

S. curtisii monticola T. and G. Fl. N. A. 2:200. 1841.
S. monticola T. and G. in Chapm. Fl. S. States 209. 1860.
S. allegheniensis House, Amer. Midland Nat. 7:131. 1921.

STEM erect, nearly glabrous, slender, 0.3-0.9 m. high; BASAL LEAVES broadly oblong, obtuse, slender-petioled; LOWER CAULINE LEAVES ovate to oblong-ovate, acute or acuminate, tapering to base, petiolate, sharply serrate or sometimes sparingly so, glabrous, 2.5-15 cm. long, 0.8-3.8 cm. wide; UPPER CAULINE LEAVES lanceolate, sessile, entire; INFLORESCENCE virgate or thyrsoid; HEADS non-secund; INVOLUCRE 4 mm. high; TEGULES lance-oblong, acutish or obtuse, about 4 rows; RAYS 5-6; ACHENES glabrous.—Mountain woods: Pa., W. Va. and Md. to Tenn., Ga. and Ala.

House (14) has pointed out that the specific name for the above plant is invalidated by its prior use for a different plant. He therefore proposes *S. allcgheniensis* House as a new name. I have been unable to determine whether the plant earlier given the name "monticola" by Jordan is a valid species. If it is, then House's name "allegheniensis" should be substituted for the name above used.

53. SOLIDAGO MORITURA Steele.

S. missouriensis fasciculata Holz. (See Rydb. Prairie Flora 795. 1932.)
S. moritura Steele Contr. U. S. Natl. Herb. 13:370. 1911.

STEM assurgent at base, more or less procumbent, glabrous throughout, finely striate, 0.3-0.6 m. high; BASAL LEAVES similar to lower cauline ? ; LOWER CAULINE LEAVES linear-oblanceolate, sharply acuminate, insensibly narrowed into long petiolar base, entire or with few short sharp teeth, glabrous except for hispidulous margin, 3-13 cm. long, 4-7 mm. wide; UPPER CAULINE LEAVES linear-lanceolate, petioles gradually reduced upward until uppermost leaves are sessile, blades largest near middle of stem, rarely 7 mm. broad, reduced upward on stem, otherwise similar to lower cauline leaves. INFLORESCENCE glabrous, short, ovoid or pyramidal with strongly recurved-spreading branches; HEADS secund; INVOLUCRE 4-5 mm. high; TEGULES linear-oblong, obtuse; RAYS 8-9; DISC FLOWERS appx. 12; ACHENES strigose.—Prairies: Ill., Ia., Kan. and Mo.

54. SOLIDAGO MULTIRADIATA Ait.

S. compacta Turcz. Bull. Soc. Nat. Mosc. 73. 1840.
S. corymbosa Nutt. Trans. Amer. Phil. Soc. 7:328. 1840.
S. heterophylla Nutt. in Gray Syn. Fl. N. A. 2:148. 1884.

STEM decumbent, tufted, nearly or quite glabrous, 0.1-1.3 m. high; BASAL LEAVES spatulate or obovate, obtuse, narrowed into a petiole, serrate near summit of leaf; LOWER CAULINE LEAVES spatulate-linear, obtuse, entire except for ciliate margins in lower half of leaf, 7.5-12.5 cm. long, 0.6-1.8 cm. wide; UPPER CAULINE LEAVES similar except smaller; INFLORESCENCE hirsute, dense thyrsiform or corymbiform cluster; HEADS nonsecund; INVOLUCRE 7-9 mm. high; TEGULES lanceolate, serrulate-ciliolate, acute; RAYS 8-15, conspicuous. ACHENES pubescent.—Calif., Ut., Colo., Wyo., Mont., Man., nw. to Alaska and e. to N. S. and Nfd.

55. SOLIDAGO NEMORALIS Ait. Map 16.

S. cinerascens Schwein. Ell. Sk. 2:375. 1824.
S. conferta Poir. Enc. Meth. 8:459. 1808.
S. decemflora DC. Prodr. 5:332. 1836.
S. hispida Muhl. Willd. Spec. 3:2063. 1803.
S. humilis Mill. Gard. Dict. ed. 8, 1768. (Not Pursh.)
S. nemoralis arenicola Burgess, B. and B. Ill. Fl. 3:344. 1898.
S. nemoralis Ait. Hort. Kew. 3:213. 1789.
S. puberula DC. Prodr. 5:333. 1836.
S. nemoralis reducta Farwell, Amer. Midland Nat. 11:72-85. 1928.

STEM erect, minutely grayish pubescent, .15-1 m. high; BASAL LEAVES oblanceolate, crenate-dentate, long-petioled, present at flowering time; LOWER CAULINE LEAVES spatulate or oblanceolate to elliptical, acute, gradually narrowed to long petiolate base, crenate-dentate, densely, minutely and roughly pubescent on both surfaces, 7.5-15 cm. long, 0.8-2.4 cm. wide; UPPER CAULINE LEAVES much reduced, linear-oblanceolate to linear, entire; INFLORESCENCE densely pubescent throughout, virgate with recurved top to broadly racemiform or sometimes with several long racemiform branches; HEADS strongly secund; INVOLUCRE 3-4.5 mm. high; TEGULES linear-oblong, light yellow, obtuse, 4 or 5 rows; RAYS 5-9; ACHENES pubescent.—Dry open places, sometimes in clearings and in sparse woods: Nfd. (Greene Herbarium, U. of Notre Dame), w. to Sask., s. to Ariz. and Fla.

Mackenzie (17) thinks it probable that Miller used the name *S. humilis* in 1768 to apply to the species which Aiton named *S. nemoralis* in 1789. Pursh (1814) applied the name *S. humilis* Pursh to what was later named *S. uliginosa* Nutt. by Nuttall in 1834. Porter (24) (1894) proposed the name *S. Purshii* Porter to replace *S. humilis* Pursh, invalidated by Miller's prior use. *S. humilis* was confused in Gray Man. 6 ed. and Greene (11) discards all for *S. racemosa* Greene (1897). The net result of all of this has been much confusion in the use of the name *S. humilis,* so that earlier references may apply to *S. uliginosa* Nutt., *S. racemosa* Greene or *S. nemoralis* Ait. For this reason it is here proposed to retain the name *S. nemoralis,* which has been in use for this species for almost 150 years, and is now used by all of the manuals, in spite of the fact that on the grounds of strict priority *S. humilis* Miller 1768 probably should replace *S. nemoralis* Aiton 1789. Benke (3) has differentiated *S. nemoralis* Ait. forma *pallens* from Massachusetts. It differs from the species in that rays and disc flowers are yellowish-cream colored.

56. SOLIDAGO OHIOENSIS Riddell. Map 17.

S. ohioensis Riddell, Syn. Fl. W. States 57. 1835.

STEM erect, glabrous throughout, 0.6-0.9 m. high; BASAL LEAVES oblong-lanceolate, entire except for ciliolate margins, or with very shallow serrations above the middle, tapering to very long winged petioles, present at flowering time; LOWER CAULINE LEAVES similar to basal except less frequently serrate, glabrous except for ciliolate margins, 8-30 cm. long, 2-4 cm. wide, UPPER CAULINE LEAVES much reduced, entire, sessile; INFLORESCENCE glabrous throughout, a compound corymb; HEADS nonsecund; INVOLUCRE 4.5-6 mm. high; TEGULES broadly oblong, very obtuse, margin slightly fringed in upper one-fourth; RAYS 6-9; DISC FLOWERS about 10; ACHENES glabrous.—Boggy places: s. Ont., w. N. Y. and Mich. to Ind., Ill. and Wis.

57. SOLIDAGO OVATA sp. nov. Map 18.

STEM erect, densely short pubescent throughout or glabrous below, purplish green, 0.6-1.2 m. high; BASAL LEAVES ovate, petioled, coarsely serrate; LOWER CAULINE LEAVES ovate to ovate-lanceolate, acute or acuminate, abruptly narrowed to short, prominently margined petioles, coarsely serrate, sparsely short pubescent on upper surface, densely pubescent on lower surface, 6-12 cm. long including petiole, 4-6 cm. wide; UPPER CAULINE LEAVES similar except reduced in size, sessile and uppermost entire, insensibly grading into bracts which go high into the branches of the inflorescence; INFLORESCENCE pubescent, several widely divergent branches each quite leafy below and with numerous secondary branches which in turn may be leafy below and densely floriferous above; HEADS secund; INVOLUCRE 3-4 mm. high; TEGULES lanceolate, acute, ciliolate in margins above, 3-4 rows; RAYS 1-4; DISC FLOWERS 5-10; ACHENES about 1 mm. long, pubescent; PAPPUS capillary, 1 mm. long.—Dry wooded banks, two miles w. Centerton, Morgan Co., Ind.

Caulis erectus, dense minuteque pubescens vel inferne glaber, purpurascenti-viridis, 0.6-1.2 m. altus; folia basilaria ovata, petiolata, grosse serrata; inferiora caulina ovata vel ovatolanceolata, apice acuta vel acuminata, abrupte in petiolum brevem valdeque marginatum contracta; grosse serrata, supra sparse minuteque, subtus dense pubescentia, cum petiolo 6-12 cm. longa, 4-6 cm. lata; superiora eis similia, minora, sessilia sursum valde sensim decrescentia in bracteas transeuntia, suprema integra; inflorescentiae pubescentes, ramis nonnullis late divaricatis, dense foliosis atque ramulis numerosis, foliosis; capitulis secundis dense congestis; involucra 3-4 mm. alta; phyllis lanceolatis, acutis, apicem versus marginibus ciliolatis, 3-4 seriatim imbricatis; floribus marginalibus 1-4; floribus disci 5-10; achaeniis c. 1 mm. longis, pubescentibus; pappo setuloso, 1 mm. longo.

This species resembles *S. ulmifolia* Muhl. and *S. sphacelata* Raf. The leaf bases are more abrupt in their narrowing than in *S. ulmifolia* but less so than *S. sphacelata;* the leaf margins resemble *S. ulmifolia.* The pappus of *S. ulmifolia* is about twice as long as the achene; in *S. ovata* it is same length as the achene and in *S. sphacelata* it is one-half as long as the achene.

58. SOLIDAGO PATULA Muhl. Map 19.

S. angulata Mart. Hort. Erlang. 180. 1814.
S. angulata Schrad. DC. Prodr. 5:331. 1836.
S. angulata Spreng. in herb. Willd. (from McMillan).
S. asperata Banks, in Pursh Fl. Amer. Sept. 2:537. 1814.
S. frankii A. Gray, Syn. Fl. N. A. 2:152. 1884.
S. patula Muhl. in Willd. Sp. Pl. 3:2059. 1804.
S. patula macra Farwell, Rept. Mich. Acad. Sci. 17:171. 1916.
S. patula strictula T. and G. Fl. N. A. 2:213. 1842.
S. salicina Ell. Sketches 2:389. 1821-24.
S. scabra Hook. Comp. Bot. Mag. 1:97. 1835.

STEM erect, smooth below, scabrous above, definitely 4-angled, 0.5-2 m. high; BASAL LEAVES broadly ovate, acute, narrowed to very long winged petiole, sharply and sometimes doubly serrate, smooth below, very rough above, present at flowering time; LOWER CAULINE LEAVES similar to basal, becoming ovate-lanceolate and then elliptic-lanceolate upward, 7.5-12.5 cm. long, 2.5-5 cm. wide; UPPER CAULINE LEAVES much reduced; INFLORESCENCE scabrous-pubescent, varying from simple to widely branched compound raceme; HEADS secund; INVOLUCRE 3-4.3 mm. high; TEGULES linear-oblong to ovate-lanceolate, acute, ciliolate margined; RAYS 3-6; DISC FLOWERS 8-12; ACHENES glabrous.—Swampy and boggy places: Me., w. to Ont. and Minn., s. to Ga., Ala., Tex. and Mo.

Mackenzie (16, 19) has shown that Linnæus' *S. rigida* was what has been passing in the manuals as *S. patula* Muhl. If this were accepted, *S. patula* Muhl. of the manuals would become *S. rigida* L., *S. rigida* L. of the manuals would become *S. grandiflora* Raf. and *S. patula* Muhl. would be reduced to synonymy. Weatherby (27) has pointed out that usage has so fixed the present manual treatment of these species that to change now would only add confusion.

59. SOLIDAGO PETIOLARIS Ait.

S. angusta T. and G. Fl. N. A. 2:204. 1841.
S. elata Ell. Sketches 2:389. 1821-24.
S. erecta Nutt. Gen. 2:161. 1818.
S. petiolaris Ait. Hort. Kew. 1789.
S. squarrosa Nutt. Jour. Acad. Phila. 7:102. 1834.

STEM erect, puberulent, 0.2-1 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES oval or oblong to elliptical, mucronate, narrowed to very short petiole, margin serrate except near base (of each leaf), ciliolate, very veiny, pubescent on veins beneath, minutely puberulent between veins beneath, 1.5-9 cm. long, 1-3 cm. wide; UPPER CAULINE LEAVES similar except gradually smaller and with entire ciliolate margins; INFLORESCENCE pubescent, a compound raceme with lower branches elongated and leafy-bracted in lower half or sometimes merely a narrow virgate raceme; HEADS nonsecund; INVOLUCRE 5-7 mm. high; TEGULES oblong-lanceolate, acute, pubescent, the lower recurved or squarrose; RAYS about 4-6; DISC FLOWERS 9-12; ACHENES glabrous.—Dry woods: sw. Ill. to Neb., s. to w. Tex., N. C. and Fla.

This species has been reported from Clark and Jefferson counties in southeastern Indiana (17, 18, 19), but I have not seen it in a single herbarium nor have I been able to collect it in these counties.

60. SOLIDAGO PETIOLATA Mill.

S. linearia Mill. Gard. Dict. Abr. 6 ed. No. 24. 1771.
S. linoides Sol. in Gray, Syn. Fl. N. A. 2:150. 1884.
S. obtusifolia Mill. Gard. Dict. Abr. 6 ed. No. 26. 1771. (Mackenzie 22.)
S. petiolata Mill. Gard. Dict. 8 ed. No. 29. 1768.
S. salicifolia Salisb. Prod. 199 (Index Kew.)
S. stricta Ait. Hort. Kew. 3:216. 1789.
S. virgata Michx. Fl. Bor. Amer. 2:117. 1803.

STEM erect, slender, glabrous throughout, simple and wand-like (injured plants show numerous branches each like the original plant), 0.6-2.4 m. high; BASAL LEAVES oblong to spatulate, entire; LOWER CAULINE LEAVES narrowly oblong to spatulate, obtuse, narrowed to margined petiole, entire or sparingly serrate, entirely glabrous on both surfaces, 7.5-20 cm. long, 1.2-2.5 cm. wide; UPPER CAULINE LEAVES abruptly much smaller, erect or appressed to the stem, insensibly merging into bracts of the inflorescence; INFLORESCENCE glabrous, virgate, cylindrical; HEADS nonsecund; INVOLUCRE 4-5 mm. high; TEGULES linear, acute, 3-4 rows; RAYS 5-7; DISC FLOWERS 8-12; ACHENES glabrous.—Low pine barrens: N. J. to Fla. and Tex.

This species has been reported as *S. stricta* Ait. for Indiana by Barnes (2), Coulter (7) and Markle (21). Since this is so far out of the known range and in view of the fact that I have been unable to locate a single specimen either in herbaria or in the field, I conclude that these reports must apply to some other species, more likely to

S. uniligulata (DC.) Porter. This is all the more likely since the latter species is not mentioned in any of the lists along with *S. stricta.*

61. SOLIDAGO PROCERA Ait.

S. altissima procera Fernald, Rhodora 10:84-96. 1908.
S. canadensis procera T. and G. Fl. N. A. 2:224. 1841.
S. perornata Lunell, Amer. Midland Nat. 2:142-149. 1911.
S. procera Ait. Hort. Kew. 3:211. 1789.
S. rugosa pallida Peck. N. Y. St. Mus. Rept. 46:45. 1893.

STEM erect, pilose with long loose hairs, green, 0.7-2 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES lanceolate, acute, entire or shallow-toothed, puberulent above, pilose on the veins and short-pubescent between veins beneath, 5-8 cm. long, 8-24 mm. wide; UPPER CAULINE LEAVES gradually reduced, entire, otherwise similar to lower; INFLORESCENCE pubescent, branches of panicle strongly ascending and scarcely recurved; HEADS strongly secund; INVOLUCRE 3.5-4 mm. high; TEGULES linear-lanceolate, acute, 3-4 rows; RAYS 9-15; ACHENES hirsute.—Rich open ground: Mich. to N. Dak., s. to Kan., W. Va. and Tenn.

62. SOLIDAGO PUBERULA Nutt.

S. puberula Nutt. Gen. 2:162. 1818.
S. pubescens Ell. Sketches 2:381. 1821-24.

STEM erect, puberulent, green or red, 0.2-1 m. high; BASAL LEAVES oblanceolate, serrate, narrowed to long-margined petiole, present at flowering time; LOWER CAULINE LEAVES lanceolate to oblanceolate, acute, narrowed to margined petiole, serrate, minutely puberulent especially beneath, 2.5-15 cm. long, 1-3 cm. wide; UPPER CAULINE LEAVES elliptic, entire, gradually reduced, otherwise similar to lower; INFLORESCENCE puberulent, from virgate-elongate raceme to open-branched panicle; HEADS nonsecund; INVOLUCRE 3-4 mm. high; TEGULES linear-subulate, very acute, 2-3 rows; RAYS 9-12; DISC FLOWERS 9-12; ACHENES glabrous.—Dry, rocky or sandy soil: Cape Breton Is. w. to Que., s. to Pa., Tenn., Miss. and Fla. Chiefly near coast and on mountains when inland. This species has been reported for Jefferson Co., Ind. (28), but the report is probably an error.

63. SOLIDAGO RACEMOSA Greene. Map 20.

S. humilis Gray, Man. 6 ed. in part. (Not Pursh.)
S. purshii Porter, Bul. Torr. Bot. Cl. 21:310-11. 1894.
S. racemosa Greene, Pittonia 3:160. 1897.

STEM erect, slender, glabrous throughout, tufted 0.1-0.6 m. high; BASAL LEAVES narrowly oblanceolate, acute, narrowed to base, serrate above middle, present in rosettes at flowering time; LOWER CAULINE LEAVES similar to basal, sessile, glabrous, 3.5-10 cm. long, 5-8 mm. wide; UPPER CAULINE LEAVES similar except reduced in size and uppermost entire; all leaves bearing axillary fascicles; INFLORESCENCE glabrous, simple or rarely panicled; HEADS non-secund; INVOLUCRE 5-8 mm. high; TEGULES linear, obtuse or acutish, 3-4 rows; RAYS 6-8; ACHENES pubescent.—Calcareous ledges, also sand hills: Nfd., n. N. Y., Vt. and Va., also in dunes of nw. Ind. and se. Mich.

64. SOLIDAGO RADULA Nutt.

S. decemflora A. Gray, Pl. Lindh. 2:223. 1849.
S. radula Nutt. Jour. Acad. Phila. 7:102. 1834.
S. rotundifolia DC. Prodr. 5:332. 1836.
S. scaberrima T. and G. Fl. N. A. 2:220. 1841.

STEM erect, rough-pubescent, slender, 0.3-1 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES oblanceolate to obovate, acute to obtuse, narrowed to short-winged petiole, dentate-crenate, rough-pubescent on both surfaces, 7.5-20 cm. long, 1-4 cm. wide; UPPER CAULINE LEAVES oblanceolate, entire or nearly so, sessile, much reduced in size; INFLORESCENCE pubescent, from narrow one-sided panicle to several somewhat recurved branches, each a panicle; HEADS secund; INVOLUCRE 4-6 mm. high; TEGULES linear-oblong, obtuse; RAYS 3-7; ACHENES minutely pubescent.—Dry soil: Sw. Ill. to Kan., s. to w. La. and w. Tex.

65. SOLIDAGO RANDII (Porter) Britton.

S. puberula monticola Porter, Bul. Torr. Bot. Cl. 19:129. 1891.
S. randii Britton, Man. 937. 1901.
S. randii monticola (Porter) Fernald, Gray Man. 7 ed. 791. 1908.
S. virgaurea deanei Porter, Mem. Torr. Bot. Cl. 5:320. 1894.
S. virgaurea monticola Porter, Bul. Torr. Bot. Cl. 20:209. 1893.
S. virgaurea randii Porter, Bul. Torr. Bot. Cl. 20:208. 1893.
S. virgaurea redfieldii Porter, Bul. Torr. Bot. Cl. 20:209. 1893.

STEM erect, often glutinous, stout, often purple-tinged, glabrous below, puberulent above, 0.1-0.8 m. high; BASAL LEAVES narrowly oblanceolate to obovate, acute or obtuse, narrowed to margined petiole, serrate or dentate, glabrous, present at flowering time; LOWER CAULINE LEAVES similar to basal, 7.5-20 cm. long, 2.5 cm. wide or less; UPPER CAULINE LEAVES lanceolate or elliptical, gradually reduced upward, entire or sparingly serrate; INFLORESCENCE puberulent, from short compact to loose virgate thyrse or an ample branched panicle; HEADS nonsecund; INVOLUCRE 5-6 mm. high, 3-5 mm. broad; TEGULES lance-deltoid to linear, obtuse or acute, yellowish with scarious margins; ACHENES sparingly appressed-setulose or glabrate. —Granitic rocks or dry granitic soil: Me., Mass., N. H., Vt., n. N. Y. to Mich., also in mts. of Va.

66. SOLIDAGO RIDDELLII Frank. Map 21.

S. amplexicaulis Mart. Bull. Acad. Sci. Brux. 8:68. 1841.
S. riddellii Frank. Syn. Fl. W. U. S. 57. 1835.
Oligoneuron riddellii Rydb. Prairie Flora 799. 1932.

STEM erect, stout, green, glabrous below, pubescent above, 0.3-1 m. high; BASAL LEAVES very narrowly lanceolate, gradually narrowed to very long petiole, present at flowering time; LOWER CAULINE LEAVES linear-lanceolate, acute, sheathing at base, recurved, margins entire, ciliolate, glabrous on both surfaces, V-shaped in vertical section 1-3 dm. long, 0.8-2 cm. wide; UPPER CAULINE LEAVES simila except smaller and uppermost sessile but hardly clasping; INFLORESCENCE pubescent, compound racemose corymb; HEADS nonsecund; INVOLUCRE 4.5-7 mm. high; TEGULES broadly oblong, obtuse, with narrow scarious margins, somewhat ciliolate in upper fourth; RAYS 7-9; DISC FLOWERS 10-20; ACHENES glabrous, obscurely 4-5 ribbed.—Wet prairies: Ont., Mich., Wis., Minn. s. to O., Ind., Ill., Mo. and Ia.

67. SOLIDAGO RIGIDA L. Map 22.

S. asperula Juss. in DC. Prodr. 5:337. 1836.
S. grandiflora Raf. Med. Repos. II 5:359. 1808.
S. rigida L. Sp. Pl. 880. 1753.
Oligoneuron rigidum (L.) Small. Fl. S. E. U. S. 1188. 1913.

STEM erect, minutely densely pubescent, very stout, 0.3-1.5 m. high; BASAL LEAVES ovate-lanceolate to broadly oblong, serrate, very longetioled, present at flowering time; LOWER CAULINE LEAVES ovate, vate-lanceolate to oval or broadly oblong, acute, narrowed to margined etiole, finely serrate or entire, very rough with short dense pubescence n both surfaces, thick and rigid, 0.7-3 dm. long, 2.5-7.5 cm. wide; PPER CAULINE LEAVES similar except much reduced, sessile and ntire or slightly serrate; INFLORESCENCE pubescent, dense com-ound corymb; HEADS nonsecund; INVOLUCRE 6-8 mm. high; EGULES broadly oblong, obtuse, with ciliolate margins and slightly ubescent surface; RAYS 6-10; DISC FLOWERS 20-30; ACHENES labrous.—Dry soil: Mass., Ont., N. W. T., Sask., s. to Col. and Tex., . to Ga.

Mackenzie (16) has shown that S. *rigida* was applied by Linnæus to hat has been passing in the manuals as S. *patula* Muhl. This would educe S. *patula* Muhl. to synonymy and elevate S. *grandiflora* Raf. to he valid name of this species.

68. SOLIDAGO RIGIDIUSCULA (T. and G.) Porter. Map 23.

S. pallida Rydb. Bul. Torr. Bot. Cl. 33:153. 1906.
S. rigidiuscula (T. and G.) Porter, Mem. Torr. Bot. Cl. 5:319. 1894.
S. speciosa angustata T. and G. in Gray Man. 7 ed. 792. 1908.
S. speciosa pallida Porter, Bul. Torr. Bot. Cl. 19:130. 1892.
S. speciosa rigidiuscula T. and G. Fl. N. A. 2:205. 1841.

STEM erect, glabrous below, minutely pubescent above, 0.3-1.2 m. igh; BASAL LEAVES lanceolate to ovate-lanceolate, very shallowly renate, ciliolate, gradually narrowed to long-margined petiole, present t flowering time; LOWER CAULINE LEAVES oblong-lanceolate, cute, gradually narrowed to short-margined petiole, entire or occasion-lly the lowermost with a few very inconspicuous crenations, strongly iliolate, glabrous on both surfaces, 2.5-12.5 cm. long, 0.6-2.4 cm. wide; PPER CAULINE LEAVES similar except reduced in size, sessile or etioled; INFLORESCENCE minutely pubescent, slender virgate ra-me or some of the lower branches somewhat elongate making a broader anicle, the lower branches often in axils of upper leaves; HEADS non-ecund; INVOLUCRE 3.5-5 mm. high; TEGULES oblong, obtuse, 4-5 ws; RAYS 6-10; DISC FLOWERS 6-10; ACHENES glabrous.—ry soil, especially dunes: O., Mich., Ont., sw. through Minn., S. Dak., eb., Col., and Tex., e. to La. and Ala., n. to O.

69. SOLIDAGO RUGOSA Miller. Map 24.

S. altissima Ait. Hort. Kew. 3:212. 1789.
S. altissima DC. Prodr. 5:333. 1836.
S. altissima T. and G. Fl. N. A. 2:216. 1841. (In part.)
S. aspera DC. Prodr. 5:333. 1836.
S. asperata Sol. in Gray, Syn. Fl. N. A. 2:153. 1884.
S. asperula Desf. Cat. Hort. Paris 3 ed., 403. 1829.
S. bosciana Moretti, in DC. Prodr. 5:333. 1836.
S. hirta Willd. Enum. Hort. Berol. 891. 1809.
S. humilis DC. Prodr. 5:333. 1836.
S. pilosa Mill. Gard. Dict. 8 ed., No. 9. 1768.
S. recurvata Mill. Gard. Dict. 8 ed., No. 28. 1768.
S. rigidula Bosc. in DC. Prodr. 5:333. 1836.
S. rugosa DC. Prodr. 5:333. 1836.
S. rugosa Mill. Gard. Dict. 8 ed., No. 25. 1768.
S. virginiana Mill. Gard. Dict. 8 ed., No. 11. 1768.

STEM erect, villous or coarsely pubescent throughout or sometimes almost glabrous below, spreading by horizontal underground stolons 0.5-2 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES lanceolate to elliptical or ovate-lanceolate, acute or acuminate, cuneate at base, sessile or very short margined-petioled sharply serrate, more or less rugose and sparingly short pubescent above densely pubescent below, 2.5-12.5 cm. long, 0.8-3.6 cm. wide; UPPER CAULINE LEAVES similar except smaller, continuing into lower half of inflorescence, insensibly grading into bracts; INFLORESCENCE pubescent, varying from narrow compact to broadly spreading pyramidal panicle and often with lower branches of panicle very widely divergent and leafy bracted in lower half; HEADS secund; INVOLUCRE 3-4 mm. high; TEGULES linear, obtuse or acute, 3 rows; RAYS 6-9; DISC FLOWERS 4-7; ACHENES pubescent.—Fields, roadsides, thickets: Nfd., w. to Man., s. to Mo., Okla. and Tex., e. to Fla. Presence of underground stolons most readily differentiates this species from *S. ulmifolia.*

70. SOLIDAGO RUGOSA ASPERA (Ait.) Fernald.

S. aspera Ait. Hort. Kew. 3:212. 1789.
S. rugosa aspera Fernald, Rhodora 17:1-20. 1915.

Differs from the preceding in more scabrous and less villous stem scabrous and more rugose surfaces of leaves, and leaf bases rounded instead of cuneate. Similar habitats: Mass. to O., s. to Tex. and Fla.

71. SOLIDAGO RUGOSA SPHAGNOPHILA Graves.

S. rugosa sphagnophila Graves, Rhodora 6:182-184. 1904.

Differs from the species in that stems and leaves are glabrous.—Bogs and wet places: N. S. to Mass. and Ct.

72. SOLIDAGO RUGOSA VILLOSA (Pursh) Fernald.

S. altissima T. and G. Fl. N. A. 2:216. 1841. (In part.)
S. humilis Desf. Cat. Hort. Paris 3 ed., 402. 1829.
S. rugosa villosa (Pursh) Fernald, Rhodora 10:84-96. 1908.
S. villosa Pursh Fl. Am. Sept. 536. 1814.

Differs from the species in that the inflorescence is subtended by large leaves which equal or exceed the inflorescence.—Lab. and w. Nfd. to w. Que. and n. Me.

73. SOLIDAGO RUPESTRIS Raf. Map 25.

S. parviflora Raf. Ann. Nat. 14. 1820.
S. rupestris Raf. Ann. Nat. 14. 1820.

STEM erect, slender, glabrous 0.5-1 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES linear-lanceolate, tapering both ways, entire or nearly so, glabrous on both surfaces, 5-12.5 cm. long, 6-10 mm. wide; UPPER CAULINE LEAVES similar except reduced; INFLORESCENCE glabrous, elongated, ascending, somewhat recurved panicles; HEADS secund; INVOLUCRE 2-2.8 mm. high; TEGULES linear, attenuate; RAYS 4-6; ACHENES glabrous or nearly so.—Rocky stream banks and open woods: Ind., Ky. and W. Va., also n. N. Y. (14). Reported from Floyd (6, 25) and Clark (1) Cos., Ind.

74. SOLIDAGO SCIAPHILA Steele.

S. sciaphila Steele, Contr. U. S. Natl. Herb. 13:371. 1911.

STEM erect, glabrous below, puberulent high in inflorescence, striate, 0.5-1 m. high; BASAL LEAVES absent at flowering time ?; LOWER CAULINE LEAVES spatulate to broadly oblanceolate, or rhombic-ovate, obtuse, mucronate, narrowed to long petioles, entire or nearly so, margin weakly hispidulous, glabrous on both surfaces, or with occasional appressed hairs beneath, 10-15 cm. long, 2.5-6 cm. wide; UPPER CAULINE LEAVES oblong to oblong-lanceolate, much reduced, sessile; INFLORESCENCE puberulent, slender compound raceme with lower branches somewhat elongated; HEADS nonsecund; INVOLUCRE about 5 mm. high; TEGULES linear-oblong, obtuse; RAYS about 5, light yellow; DISC FLOWERS 10-12. ACHENES minutely strigose.—Shaded cliffs of Wisconsin river: Sauk Co., Wis.

75. SOLIDAGO SEMPERVIRENS L.

S. carinata Schrad. in DC. Prodr. 5:337. 1836.
S. carinosa Mill. Gard. Dict. 8 ed., No. 20. 1768.
S. elata Pursh Fl. Am. Sept. 2:543. 1814.
S. glabra Mill. Gard. Dict. 8 ed., No. 22. 1768.
S. integerrima Mill. Gard. Dict. 8 ed., No. 24. 1768.
S. lævigata Ait. Hort. Kew. 3:215. 1789.
S. limonifolia Torr. Fl. N. and Mid. U. S. 304. 1824.
S. lithospermifolia Willd. Enum. Hort. Berol. 891. 1809.
S. mexicana L. Sp. Pl. 879. 1753.
S. noveboracensis Mill. Gard. Dict. 8 ed., No. 23. 1768.
S. obliqua Moench. Meth. Suppl. 248.
S. sempervirens L. Sp. Pl. 878. 1753.
S. tardiflora Moench. Meth. 599.
S. viminea Ait. Hort. Kew. 3:215. 1789.

STEM erect or ascending, glabrous throughout or sometimes pubescent or puberulent on axis of inflorescence, green or reddish, 0.6-2.4 m. high; BASAL LEAVES very long, lanceolate, oblanceolate or oblong, entire or undulate, present at flowering time; LOWER CAULINE LEAVES lanceolate to oblanceolate, obtuse or acute, narrowed to margined petiole, entire or undulate, glabrous on both surfaces, 0.8-3 dm. long, 1-3.5 cm. wide; UPPER CAULINE LEAVES lanceolate, sessile entire; INFLORESCENCE glabrous or somewhat pubescent or puberulent, from narrow cylindric to broad open panicle; HEADS secund; INVOLUCRE 4-6 mm. high; TEGULES lanceolate, acute, 3-4 rows; RAYS 7-10; DISC FLOWERS about 15; ACHENES pubescent on angles.—Salt marshes, crevices of seashore rocks, tidal rivers and sea beaches: N. B. to Fla. and Mex., also in Bermuda.

76. SOLIDAGO SEROTINA Ait. Map 26.

S. deflexa Moench. Meth. 599. (Index Kew.)
S. fragrans Desf. Cat. Hort. Paris 3 ed. 1829.
S. fragrans Gray, Syn. Fl. N. A. 2:156. 1884.
S. gigantea Willd. Sp. Pl. 3:2056. 1803.
S. glabra Desf. Cat. Hort. Paris 3 ed. 402. 1829.
S. pitcheri Nutt. Jour. Acad. Phila. 7:101. 1834.
S. sera J. F. Gmel., Syst. 1236. (Index Kew.)
S. serotina Ait. Hort. Kew. 3:211. 1789.

STEM erect, glabrous or glaucous below, pubescent in inflorescence, green or reddish purple, 0.6-2.4 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES lanceolate, acuminate, narrowed to base, sessile or very short-petioled, sharply serrate, ciliolate on margins, glabrous on both surfaces, 7.5-15 cm. long, 0.4-3 cm. wide; UPPER CAULINE LEAVES similar except gradually reduced in size; INFLORESCENCE pubescent, broad pyramidal panicle, lower branches often elongated and recurved; HEADS secund; INVOLUCRE 3.5-5 mm. high; TEGULES lanceolate to linear, acute or obtuse, 3-4 rows; RAYS 7-15; DISC FLOWERS 8-14; ACHENES finely pubescent.—Moist soil: Nfd. to B. C., s. to Ore., Ut., Tex. and Ga.

77. SOLIDAGO SEROTINA GIGANTEA (Ait.) Gray. Map 27.

S. gigantea Ait. Hort. Kew. 3. 211. 1789.
S. serotina Willd. Sp. Pl. 3:2056. 1803.
S. serotina gigantea (Ait.) Gray, Proc. Amer. Acad. Sci. 17:179, 196. 1882.

Differs from the species in that the leaves are pubescent on the veins below.—Moist soil: N. S., Que. and Wis., s. to Mo., Tex. and S. C.

78. SOLIDAGO SHORTII T. and G. Map 28.

S. shortii T. and G. Fl. N. A. 2:222. 1842.

STEM erect, slender, glabrous below, pubescent above, 0.6-1.2 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES oblong-lanceolate, acute or acuminate, sessile or the lowest petioled, finely and sharply serrate, glabrous on both surfaces, 5-10 cm. long, 1-1.2 cm. wide; UPPER CAULINE LEAVES similar except reduced in size, uppermost entire; INFLORESCENCE puberulent, broadly pyramidal with recurved branches; HEADS secund; INVOLUCRE 4-6 mm. high; TEGULES linear-oblong, obtuse; RAYS 5-7; DISC FLOWERS 4-6; ACHENES silky-pubescent.—Clark Co., Ind., and Barry Co., Mo. (Bush).

79. SOLIDAGO SOMESII Rydb.

S. somesii Rydb. Brittonia 1:101. 1931.

STEM erect, glabrous below, pubescent in inflorescence, purplish, about 1 m. high; BASAL LEAVES absent at flowering time ?; LOWER CAULINE LEAVES lanceolate or oblanceolate, acuminate, serrate, hispid-ciliolate on margins, glabrate above, pubescent beneath, 5-10 cm.

long; UPPER CAULINE LEAVES similar except reduced in size; INFLORESCENCE hispidulous, elongate panicle with spreading branches; HEADS secund; INVOLUCRE 3 mm. high; TEGULES linear, acutish; RAYS about 10; ACHENES sparingly hirsute.—Valleys: Iowa.

80. SOLIDAGO SPECIOSA Nutt. Map 29.

S. conferta Mill. Gard. Dict. 8 ed. No. 27, 1768. (Mackenzie 18.)
S. erecta Ell. Sketches 2:385. 1824.
S. petiolaris Muhl. Cat. 79. 1813.
S. sempervirens Michx. Fl. Bor. Amer. 2:119. 1803.
S. speciosa Nutt. Gen. 2:160. 1818.

STEM erect, glabrous below, short-pubescent on upper one-third below the inflorescence and densely so in inflorescence, green or reddish, 0.6-2.1 m. high; BASAL LEAVES very broadly ovate to oval, serrate or crenate, present at flowering time; LOWER CAULINE LEAVES oval, ovate to ovate-lanceolate, obtuse or acute, narrowed to margined petiole, entire or serrate, ciliolate on margins, glabrous on both surfaces, 1-2.5 dm. long, 2.5-10 cm. wide; UPPER CAULINE LEAVES elliptical, oblong or lanceolate, reduced in size, sessile, ciliolate; INFLORESCENCE densely short-pubescent, elongated terminal panicle with ascending branches; HEADS nonsecund; INVOLUCRE 4.5-6 mm. high; TEGULES oblong, obtuse, denticulate at apex, 4-5 rows; RAYS 5-8; DISC FLOWERS 4-7; ACHENES glabrous or nearly so.—Dry open woods and thickets, sandy or clay soil: N. S., w. to Minn., s. to Neb., Kan. and Okla., e. to Ark., Tenn. and N. C.

Mackenzie (18) has shown that on grounds of priority this species should be cited as *S. conferta* Miller.

81. SOLIDAGO SPHACELATA Raf. Map 30.

Brachychæta cordata T. and G. Fl. N. A. 2:195. 1841.
B. sphacelata Britton, Bul. Torr. Bot. Cl. 20:484. 1893.
Solidago cordata Short, Trans. Jour. Med. 7:599. 1834.
S. sphacelata Raf. Ann. Nat. 14. 1820.

STEM erect, pubescent, green, 0.6-1.2 m. high; BASAL LEAVES ovate, cordate or truncate at base, serrate, present at flowering time; LOWER CAULINE LEAVES ovate, acute, cordate, truncate or merely abruptly narrowed to base, petioled, serrate, sparingly short-pubescent above, pubescent below, 5-15 cm. long, 2-6 cm. wide; UPPER CAULINE LEAVES gradually reduced, uppermost sessile and entire; INFLORES-

CENCE pubescent, one to several slender and widely divergent branches, each leafy below, and with sessile clusters of small heads; HEADS secund or nonsecund; INVOLUCRE 1.7-3 mm. high; TEGULES linear-oblong, oblong or even ovate-oblong, obtuse, ciliolate on margin, 4-5 rows; RAYS about 5; DISC FLOWERS about 5.—Dry rocky wooded slopes: Va. to Ind., w. Ky., s. to Ala. and e. to Ga.

Differs from all other species of Solidago in that the pappus bristles (or very narrow scales) are only half as long as the achene. In *S. ovata* sp. nov. the pappus is just as long as the achene and in all other species it is twice as long as the achene, or longer. I consider this difference to be insufficient to place this species in a separate genus, as was done by Torrey and Gray and by Britton, especially in the light of the intermediate condition of *S. ovata* sp. nov.

82. SOLIDAGO SQUARROSA Muhl. Map 31.

S. confertiflora Nutt. Jour. Acad. Sci. Phila. 7:102. 1834.
S. squarrosa Muhl. Cat. 76. 1813.

STEM erect, stout, glabrous in lower three-fourths below inflorescence, pubescent in upper one-fourth and in inflorescence, green, 0.2-1.5 m. high; BASAL LEAVES broadly ovate, oval, or obovate, serrate, present at flowering time; LOWER CAULINE LEAVES broadly ovate, oval or obovate, acute, narrowed to a slightly-winged petiole, serrate, coarsely short-ciliolate on margins, glabrous on both surfaces except for short coarse pubescence on veins on both surfaces, 1-2.5 dm. long, 2.5-7.5 cm. wide; UPPER CAULINE LEAVES ovate, ovate-lanceolate to lanceolate, uppermost much reduced, sessile; INFLORESCENCE pubescent, terminal, narrowly cylindrical, leafy-bracted panicle; HEADS nonsecund; INVOLUCRE 6-8 mm. high; TEGULES lanceolate, acute, tips recurved or squarrose; RAYS 12-16; DISC FLOWERS 16-24; ACHENES glabrous.—Rocky places and wooded hills: N. B. to Ont., s. to Ind. and Ga. Clark Co., Ind., is the most westerly station known for this species.

83. SOLIDAGO SUAVEOLENS Schoepf. Map 32.

S. gonoclada DC. Prodr. 5:334. 1836.
S. lanceolata Bosc. in DC. Prodr. 5:334. 1836.
S. odora Ait. Hort. Kew. 3:214. 1789.
S. puncticulata DC. Prodr. 5:332. 1836.
S. retrorsa Michx. Fl. Bor. Amer. 2:117. 1803.
S. suaveolens Schoepf. Reise ver Nordamer. Staaten. 1:466. 1788.

STEM erect, slender, simple, glabrous or pubescent in patches or in lines below, uniformly minutely pubescent above, 0.5-1.2 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES linear-lanceolate, acute or acuminate, sessile, entire, glabrous except for ciliolate margins, anise-scented and pellucid-dotted, 5-10 cm. long, 0.6-1.6 cm. wide; UPPER CAULINE LEAVES similar except reduced in size; INFLORESCENCE pubescent, spreading in a broad open panicle; HEADS secund; INVOLUCRE 3-5 mm. high; TEGULES oblong-lanceolate, acute, the inner much longer than the outer. RAYS 2-4; DISC FLOWERS 3-5; ACHENES pubescent.—Dry or sandy soil: N. S. sw. to N. Y. and Mo., s. to Okla., Tex. and Fla.

84. SOLIDAGO TORTIFOLIA Ell.

S. odora Michx. Fl. Bor. Amer. 2:118. 1803. (Not Ait.)
S. retrorsa Pursh Fl. Am. Sept. 2:539. 1814.
S. tortifolia Ell. Sketches 2:337. 1824.

STEM erect, scabrous-puberulent, 0.5-0.9 m. high; BASAL LEAVES absent at flowering time; LOWER CAULINE LEAVES linear or linear-oblong, often twisted, acute, narrowed to sessile base, serrate, scabrous to glabrate, 2.5-5 cm. long, 3-6 mm. wide; UPPER CAULINE LEAVES similar except smaller and uppermost entire; INFLORESCENCE pubescent, broad open panicle with branches widely spreading and recurved; HEADS secund; INVOLUCRE 3-4 mm. high; TEGULES linear, obtuse or acutish, pale straw-colored, about 3 rows; RAYS 3-5; ACHENES minutely pubescent.—Dry sandy soil, mostly near coast: Md. to Fla. and Tex.

85. SOLIDAGO ULIGINOSA Nutt.

S. confertiflora Fisch. and Meyer, Ind. Sem. Hort. Petrop. 6:57. (Index Kew.)
S. humilis Pursh Fl. Amer. Sept. 5:43. 1814.
S. purshii Porter, Bul. Torr. Bot. Cl. 21:311. 1894.
S. stricta Hook. Fl. Bor. Amer. 2:4. 1834. (Not Ait.)
S. uliginosa Nutt. Jour. Acad. Sci. Phila. 7:101. 1834.

STEM erect, glabrous except in inflorescence, simple, 0.3-1.2 m. high; BASAL LEAVES oblong-lanceolate, serrate, scabrous-ciliolate, present at flowering time; LOWER CAULINE LEAVES oblong-lanceolate to lanceolate, acute, narrowed to margined petioles, serrate, scabrous-ciliolate on margins, glabrous, 1-2.3 dm. long, 1.2-3.7 cm. wide; UPPER CAULINE LEAVES lanceolate, sessile, entire, much reduced in size;

INFLORESCENCE pubescent, narrow dense wand-like panicle; HEADS nonsecund; INVOLUCRE 4-6 mm. high; TEGULES linear-oblong, obtuse; RAYS 5-6; ACHENES glabrous.—Swamps and bogs: Nfd., s. to N. C., w. to O., Mich., Minn. and Ont.

Pursh's S. *humilis* (1814) is invalidated by Miller's use of S. *humilis* (1768) (Mackenzie 17). Porter's (24) use of S. *purshii* (1894) is antedated by Nuttall's S. *uliginosa* (1834). S. *uliginosa* Nutt. has been reported for northern Indiana by a number of collectors but all specimens that I have seen are S. *uniligulata* (DC.) Porter; S. *uliginosa* Nutt. as here understood does not come into Indiana. Earlier records must be referred partly to S. *uniligulata* (DC.) Porter and partly to S. *racemosa* Greene.

86. SOLIDAGO ULIGINOSA PERACUTA (Fernald) comb. nov.

S. humilis peracuta Fernald, Rhodora 17:6-7. 1915.

This variety differs from the species in that the cauline leaves are subulate-attenuate at apex, branches (of inflorescence) hirsute, and the tegules attenuate.—Open rocky woods: Nfd.

87. SOLIDAGO ULMIFOLIA Muhl. Map 33.

S. lateriflora Ait. Hort. Kew. 3:211. 1789. (Not L.)
S. multiflora Desf. Tabl. 1 ed. 103. (Index Kew.)
S. ulmifolia Muhl. in Willd. Sp. Pl. 3:2059. 1804.

STEM erect, glabrous below, sparingly pubescent near inflorescence and definitely short pubescent in inflorescence, green, 0.6-1.2 m. high; BASAL LEAVES similar to lower cauline; LOWER CAULINE LEAVES ovate-lanceolate to lanceolate or elliptic, acute or acuminate, narrowed into short-margined petiole, coarsely serrate, sparingly coarsely pubescent on both surfaces or sometimes glabrous, 7.5-13.5 cm. long, 1.5-7.5 cm. wide; UPPER CAULINE LEAVES lanceolate, sessile, serrate; INFLORESCENCE varying from a slender virgate raceme to a panicle with several slender elongated widely divergent branches each leafy below; HEADS secund; INVOLUCRE 3-4 mm. high; TEGULES lanceolate oblong, acute or obtuse, about 4 rows; RAYS 1-6; DISC FLOWERS 2-6; ACHENES pubescent.—Dry borders of woods: N. S., s. to Ga., w. to Minn., Neb., Kan., Okla. and w. Tex.

88. SOLIDAGO UNILIGULATA (DC.) Porter. Map 34.

Bigelovia unligulata DC. Prodr. 5:320. 1836.
Chrysosoma uniligulata Nutt. Amer. Phil. Soc. Tran. 7:325. 1841.
Solidago linoides T. and G. Fl. N. A. 2:216. 1841.
S. neglecta linoides Gray, Syn. Fl. 1:154. 1884.
S. uniligulata Porter, Mem. Torr. Bot. Cl. 5:320. 1894.

STEM erect, simple, slender, glabrous below, pubescent in inflorescence, green to reddish purple, 0.3-0.9 m. high; BASAL LEAVES lanceolate, serrate, scabrous-ciliolate on margins; LOWER CAULINE LEAVES lanceolate to oblong-lanceolate, acute or acuminate, narrowed to long-margined petiole, serrate, scabrous-ciliolate on margin, glabrous on both surfaces, 1-2.5 dm. long, 0.6-3 cm. wide; UPPER CAULINE LEAVES similar except reduced in size, sessile and entire; INFLORESCENCE pubescent, a narrow elongated panicle with erect and at length spreading branches; HEADS secund; INVOLUCRE 3-5 mm. high; TEGULES linear-oblong, obtuse, pale straw-colored; RAYS 0-8, mostly 4-5; DISC FLOWERS 1-12, mostly 4-7; ACHENES glabrous.—Bogs and wet places: Nfd., s. to N. J., w. to Pa., O., s. Ind., Ill. and Ont.

89. SOLIDAGO UNILIGULATA LEVIPES Fernald. Map 35.

S. unligulata levipes Fernald, Rhodora 17:1-20. 1915.

Differs from the species in that the branches of the panicle and the pedicels are glabrous or glabrate and glutinous.—Bogs: w. N. Y. to central Ind. and Ont. Here reported for Indiana for the first time. Specimens from a small marsh one mile south of Waverly, Morgan county and from marshes near South Gary, Lake county, Indiana, are in the Butler University Herbarium.

90. SOLIDAGO UNILIGULATA NEGLECTA (T. and G.) Fernald. Map 36.

S. neglecta T. and G. Fl. N. A. 2:213. 1841.
S. uniligulata neglecta Fernald, Rhodora 23:292. 1921.

Differs from the species as follows: STEM 0.6-1.5 m. high; LOWER CAULINE LEAVES 3-8 cm. wide; RAYS 1-8, mostly 5-7; DISC FLOWERS 1-10, mostly 5-8.—Bogs and swamps: N. S. to N. Y., Mich., Wis. and Minn., s. to Ill., Ind., O., W. Va. and N. C.

91. SOLIDAGO VICTORINII Fernald.

S. victorinii Fernald, Rhodora 29:143. 1927.

STEM decumbent, subcespitose, glabrous, 1.7-2.5 dm. high; BASAL LEAVES oblanceolate, crenate-serrate, petioled, forming rosettes; CAULINE LEAVES 9-11 below the inflorescence, lowest and median oblanceolate, acute, appressed-serrate, 2-4 cm. long, 0.5-0.8 cm. wide; UPPER CAULINE LEAVES very much reduced, lanceolate, entire; INFLORESCENCE dense cylindrical thyrse, 7-8 cm. long, 2-2.5 cm. in diameter; HEADS nonsecund; INVOLUCRE 5.5-6 mm. high; TEGULES lower linear-oblong, obtuse, inner spatulate, round-tipped with ciliate apex, about 3 rows; RAYS 7; DISC FLOWERS 10; ACHENES very hirsute.—Calcareous ledges: River Chicotte, Anticosti, Que.

92. SOLIDAGO WARDII Britton.

S. wardii Britton, Man. 935. 1901.
S. petiolaris wardii Fernald, Gray Man. 7 ed. 788. 1908.

STEM erect, glabrous or puberulent, 0.4-1 m. high; CAULINE LEAVES lanceolate or ovate-lanceolate, entire or with few teeth, margins ciliate, pale and silvery, shining on both sides or only above, 5-9 cm. long, 1.5-3.5 cm. wide; INFLORESCENCE a narrow, sometimes leafy, thyrse, 1-2 dm. long; HEADS nonsecund; INVOLUCRE about 6 mm. high; TEGULES linear-lanceolate to linear-oblong, acute, distinctly squarrose; RAYS large, bright yellow.—Plains and prairies: Mo. to w. Neb., s. to Ark. and Tex.

93. SOLIDAGO CAROLINIANA B. S. P.

Erigeron carolinianum L. Sp. Pl. 2:863. 1753.
Euthamia caroliniana Greene Mem. Torr. Bot. Cl. 5:321. 1894.
E. tenuifolia Pursh Fl. Amer. Sept. 540. 1814. (In part.)
Solidago caroliniana B. S. P. Prel. Cat. N. Y. 26. 1888.
S. tenuifolia Nutt. Gen. 2:162. 1818. (In part.)

STEM glabrous, terete, striate, simple to near the summit then subcorymbosely branched, 0.6-1.2 m. high; CAULINE LEAVES linear-lanceolate, acute with one prominent and two more obscure veins, margins minutely scabrous, glabrous, minutely punctate, 2-7 cm. long, 2-4 mm. wide, all leaves below point of branching usually absent at flowering time; INFLORESCENCE minutely scabrous or hirtellous, compound-corymbose; HEADS solitary or in threes, all pedicellate; IN-

VOLUCRE 3-4 mm. high; TEGULES oblong, obtuse; DISC FLOWERS 5-6; ACHENES pubescent.—Sandy soil: N. J. to Fla. and Tex., mainly coastal.

94. SOLIDAGO GALETORUM (Greene) comb. nov.

Euthamia galetorum Greene, Leaflets 2:152. 1911.
E. graminifolia galetorum (Greene) House, Bul. N. Y. St. Mus. 254:694. 1924.

STEM glabrous throughout, terete, simple, about 0.6 m. high; CAULINE LEAVES linear, acute or acuminate, but not attenuate, broadest near base, glabrous, obscurely punctate, shining green when fresh, 3-7 cm. long, 5-9 mm. wide; INFLORESCENCE glabrous, narrowly corymbose; HEADS few or several; INVOLUCRE as broad at summit as high; TEGULES outer ovate-lanceolate, inner oblong, all obtuse, margins faintly scaberulous under lens; RAYS "rather many"; DISC FLOWERS numerous; ACHENES strigulose.—Bogs and boggy shores: N. S. and N. Y.

95. SOLIDAGO GRAMINIFOLIA (L.) Salisb.

Chrysocoma graminifolia L. Sp. Pl. 841. 1753.
Euthamia graminifolia Nutt. Gen. 2:162. 1818.
Solidago graminifolia Salisb. Prodr. 109. 1796.
S. lanceolata L. Mant. 114. 1767.

STEM glabrous, terete, striate, branched above, 0.5-1.2 m. high; CAULINE LEAVES lance-linear, acuminate, with 3 prominent and 2 obscure veins, glabrous except for minutely scabrous margins and minute pubescence on veins below, punctate under the lens, 4-13 cm. long, 4-9 mm. wide; INFLORESCENCE glabrous except for faint scaberulous margins, compound-corymbose; HEADS densely glomerate; TEGULES ovate to oblong, obtuse, all thickened and green-tipped at summit; RAYS average 12-20; DISC FLOWERS average 8-12.—Moist soil: N. S., s. to N. J., w. to Pa. and Mich. Indiana material previously passing as *S. graminifolia* is here defined as *S. perglabra* sp. nov.

96. SOLIDAGO GRAMINIFOLIA SEPTENTRIONALIS Fernald.

S. graminifolia septentrionalis Fernald, Rhodora 17:12. 1915.

Differs from the species in that the leaf tips are blunt rather than attenuate-pointed and the corymb is looser with lateral branches conspicuously elongate.

97. SOLIDAGO GYMNOSPERMOIDES (Greene) Fernald.

Euthamia gymnospermoides Greene Pittonia 5:75. 1902.
Solidago gymnospermoides Fernald, Rhodora 10:84-96. 1908.

STEM freely branched from near the base, about 0.6 m. high; CAULINE LEAVES linear-attenuate, 1-nerved, margins barely scabrous, glabrous on both sides, strongly punctate, glutinous, the median 5-7 cm. long, 2-3 mm. wide; INFLORESCENCE glabrous, corymbose; HEADS glomerate; INVOLUCRE 5-6 mm. high; TEGULES firm, obtuse, glutinous; RAYS 10-12; DISC FLOWERS 4-6; ACHENES pubescent.—Dry soil: Mo., Kan., Okla., Tex. and N. Mex.

98. SOLIDAGO HIRTELLA (Greene) Bush. Map 37.

Euthamia hirtella Greene, Leaflets 1:180. 1906.
Solidago hirtella Bush, Amer. Midland Nat. 5:160. 1917.

STEM hispidly hirtellous, terete, striate, 0.8-1.5 m. high; CAULINE LEAVES lance-linear, acuminate, with 3 prominent and 2 obscure veins, margins scabrous-ciliolate, densely scabrous-pubescent below, faintly so above, ascending, 7-12 cm. long, 6-9 mm. wide; INFLORESCENCE scabrous-hirtellous, fastigiately corymbose; HEADS densely glomerate; TEGULES outer oblong, acutish, with swollen green tips, inner oblong-lanceolate, straw-colored, without green tips, glutinous; RAYS 11-35, usually 17-22; DISC FLOWERS 2-9; usually 5-6; ACHENES pubescent.—Dry soil: Wis., Ill., Ky., Tenn., e. to W. Va. and Md., n. to Mich. and Ct.

99. SOLIDAGO LEPTOCEPHALA T. and G.

Euthamia leptocephala Greene, Mem. Torr. Bot. Cl. 5:321. 1894.
Solidago leptocephala T. and G. Fl. N. A. 2:226. 1841.

STEM smooth, branched above, 0.3-0.6 m. high; CAULINE LEAVES lance-linear, acute or acuminate, 1 prominent and with or without 2 obscure veins, scabrous-ciliolate on margin, somewhat punctate, 5-8 cm. long, 4-8 mm. wide; INFLORESCENCE corymbose; HEADS glomerate; INVOLUCRE 5-6 mm. high; TEGULES linear-oblong; RAYS 7-10; DISC FLOWERS 3-4; ACHENES pubescent.—Moist soil: Mo. to Miss., La. and Tex.

100. SOLIDAGO MEDIA (Greene) Bush. Map 38.

Euthamia media Greene, Pittonia 5:74. 1902.
Solidago media Bush, Amer. Midland Nat. 5:167. 1917.
S. moseleyi Fernald, Rhodora 10:93. 1908. (As to type, but not as to description.)

STEM slender, glabrous, striate, green, fastigiately branched above the middle, 0.6-0.9 m. high; CAULINE LEAVES narrowly linear, acuminate, with 1 prominent and 2 obscure veins, remotely scaberulous on margin, glabrous, obscurely punctate, 5-8 cm. long, 3-5 mm. wide; INFLORESCENCE glabrous, corymbose; HEADS glomerate, 3-7 at ends of slender, glabrous pedicels; INVOLUCRE 3-4.5 mm. high; TEGULES outer short, ovate, green-tipped, inner oblong, abruptly much elongated, without green tips; RAYS 8-18; DISC FLOWERS 2-8, average 4; ACHENE pubescent.—Sandy soil: Ind., Ill., Wis., Minn. to Neb. and Mo.

101. SOLIDAGO MINOR (Michx.) Fernald.

Euthamia minor Greene, Pittonia 5:78. 1902.
Solidago lanceolata minor Michx. Fl. Bor. Amer. 2:116. 1803.
S. minor Fernald, Rhodora 10:93. 1908.
S. michauxii House, Bul. N. Y. St. Mus. 254:695. 1924.
S. tenuifolia Pursh Fl. Amer. Sept. 2:540. 1814. (In part.)

STEM very slender, glabrous, fastigiately branched above the middle, 0.4-0.8 m. high; CAULINE LEAVES linear, acute, with 1 prominent vein and with or without 2 obscure veins, margin scarcely scaberulous, glabrous, 3-5 cm. long, 1-2 mm. wide, commonly subtending axillary fascicles; INFLORESCENCE glabrous, corymbose; HEADS mostly short pedicelled; INVOLUCRE 3-4 mm. high, 1-1.5 mm. thick; TEGULES straw-colored with green tips, acutish; RAYS many, conspicuous, light yellow.—Sandy soil, near coast: Ct. to Fla. and Ala.

102. SOLIDAGO NUTTALLII (Greene) Bush.

Euthamia nuttallii Greene, Pittonia 5:73. 1902.
Solidago graminifolia nuttallii Fernald, Gray Man. 7 ed. 797. 1908.
S. nuttallii (Greene) Bush, Amer. Midland Nat. 5:168. 1917.

STEM stout, minutely rough-pubescent, striate-angled, 0.6-1.2 m. high; CAULINE LEAVES lance-linear, acute, 5-veined, margins scabrous, glabrous above except for sparsely scabrous midvein, hispidulous on veins and to some extent between veins below, obscurely punctate, 5-13 cm. long, 3-8 mm. wide; INFLORESCENCE hispid-hirtellous, short, wide, subcorymbose; HEADS glomerate; INVOLUCRE 4-5 mm. high; TEGULES oblong, all with green tips; RAYS 21-34, usually 24-27; DISC FLOWERS 2-18, usually 8-12; ACHENES pubescent. —Dry soil: N. S. to Mich., O. and Ala.

103. SOLIDAGO PERGLABRA sp. nov. Map 39.

STEM glabrous throughout, terete, somewhat striate, branched above middle, 0.7-1.5 m. high; CAULINE LEAVES linear-lanceolate, acuminate, with 3 prominent and 2 obscure veins, margins scabrous-ciliolate, glabrous, minutely punctate under lens, 7-15 cm. long, 6-10 mm. wide, all ascending; INFLORESCENCE glabrous throughout, widely corymbose; HEADS glomerate on glabrous pedicels; INVOLUCRE cylindric to campanulate, 4-5 mm. high; TEGULES outer ovate, obtuse with swollen green tips, inner linear or lance-linear acute or obtusish, without green tips; RAYS average 13-17; DISC FLOWERS average 3-6; ACHENES strigillose.—Dry open fields.

Tota planta glabra; caulis teres, minute striatus, a medio ramosus, 0.7-1.5 m. altus; folia caulina lineari-lanceolata, acuminata, lamina manifeste tri- atque indistincte binervata, marginibus scabro-ciliolatis, sub lente minutissime punctata, 7-15 cm. longa, 6-10 mm. lata, adscendentia; inflorescentiae late corymbosae; capitula pedicellis glomerata; involucra cylindrica vel campanelliformia, 4-5 mm. alta; phyllis naequalibus, exterioribus ovatis atque apicibus viridibus incrassatis obtusis, interioribus linearibus vel lanceolato-linearibus, acutis vel subobtusis, sine apice viridi; flores marginales c. 13-17; flores disci c. 3-6; achaenia strigillosa.

Type specimens are my number 3542 collected on a dry bank at he east end of Mink Lake, four miles north of Valparaiso, Porter ounty, Indiana. Other specimens in the Butler University Herbarium re from Lake, Newton, Starke, Elkhart, Cass, Benton, Morgan, Daviess and Posey counties, Indiana, and from Alpena county, Mich-gan, Pocahontas county, West Virginia, and near Watseka, Illinois.

S. perglabra differs from *S. graminifolia* in that (1) only the outer egules of the former are green-tipped while in the latter species all egules are green-tipped; (2) the disc flowers average 3-6 per head in the former and 8-12 in the latter. As here defined, S. *graminifolia* is northeastern and does not come into Indiana.

104. SOLIDAGO POLYCEPHALA Fernald.

Euthamia floribunda Greene, Pittonia 5:74. 1902.
Solidago polycephala Fernald, Rhodora 10:93. 1908.

STEM glabrous below, scabrous-pubescent above, 0.6-0.9 m. high; CAULINE LEAVES linear-lanceolate, acute, 3-veined, minutely pubescent on both sides, especially on midvein below, spreading or deflexed, 5-8 cm. long, 5-6 mm. wide; INFLORESCENCE hispidulous, densely fastigiate corymb, bracteate with spreading or deflexed bracts; HEADS glomerate; INVOLUCRE 3-3.5 mm. high; TEGULES closely appressed with conspicuous green tips, puberulent, glutinous.—Fields and borders of marshes, local, s. N. J. and e. Pa.

105. SOLIDAGO REMOTA (Greene) comb. nov. Map 40.

Euthamia remota Greene, Pittonia 5:78. 1902.
Solidago moseleyi Fernald, Rhodora 10:93. 1908. (As to description but not as to type.)

STEM glabrous throughout, branched above middle, 0.3-0.6 m. high; CAULINE LEAVES narrowly linear, acuminate, 1 prominent and 2 obscure veins, margins very minutely scaberulous, glabrous on both surfaces, obscurely punctate, ascending, 4-7 cm. long, 2-4 mm. wide; INFLORESCENCE glabrous, corymbose; HEADS borne singly on slender glabrous pedicels, not glomerate; INVOLUCRE 4-5 mm. high; TEGULES outer short, ovate, green-tipped, inner lance-oblong, much longer, without green tips; RAYS 8-12; DISC FLOWERS 3-6, usually 4 or 5; ACHENES pubescent.—Sandy prairies: n. Ind. to Wis.

106. SOLIDAGO TENUIFOLIA Pursh.

Euthamia tenuifolia Greene, Pittonia 5:77. 1902.
Solidago tenuifolia Pursh Fl. Amer. Sept. 540. 1814.

STEM glabrous, striate, simple to near summit, then corymbosely branched, 0.2-0.5 m. high; CAULINE LEAVES narrowly linear, acute, 1-veined or obscurely 3-veined, margins minutely scabrous, glabrous, obscurely punctate, spreading or somewhat deflected, 2-7 cm. long, 2-4 mm. wide; INFLORESCENCE glabrous except pedicels slightly scaberulous, corymbose; HEADS glomerate; INVOLUCRE about 3 mm. high; TEGULES oblong, obtuse, slightly green-tipped; RAYS 6-12; DISC FLOWERS 4-5; ACHENES pubescent.—Sandy soil near the seaboard: N. S. to Fla.

107. SOLIDAGO TENUIFOLIA PYCNOCEPHALA Fernald.

S. tenuifolia pycnocephala Fernald, Rhodora 23:293. 1923.

"Differs from typical *S. tenuifolia* in its simple habit; erect, very thick, firm, broad, short and obtuse or merely acutish leaves; its very compact and small inflorescence; and more glutinous involucre, with often broader bracts, the outer with dark green summits and glandular-ciliate margins."—Peaty, gravelly or sandy margins of lakes: N. S.

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